

## THE ECHINODERM NEWSLETTER

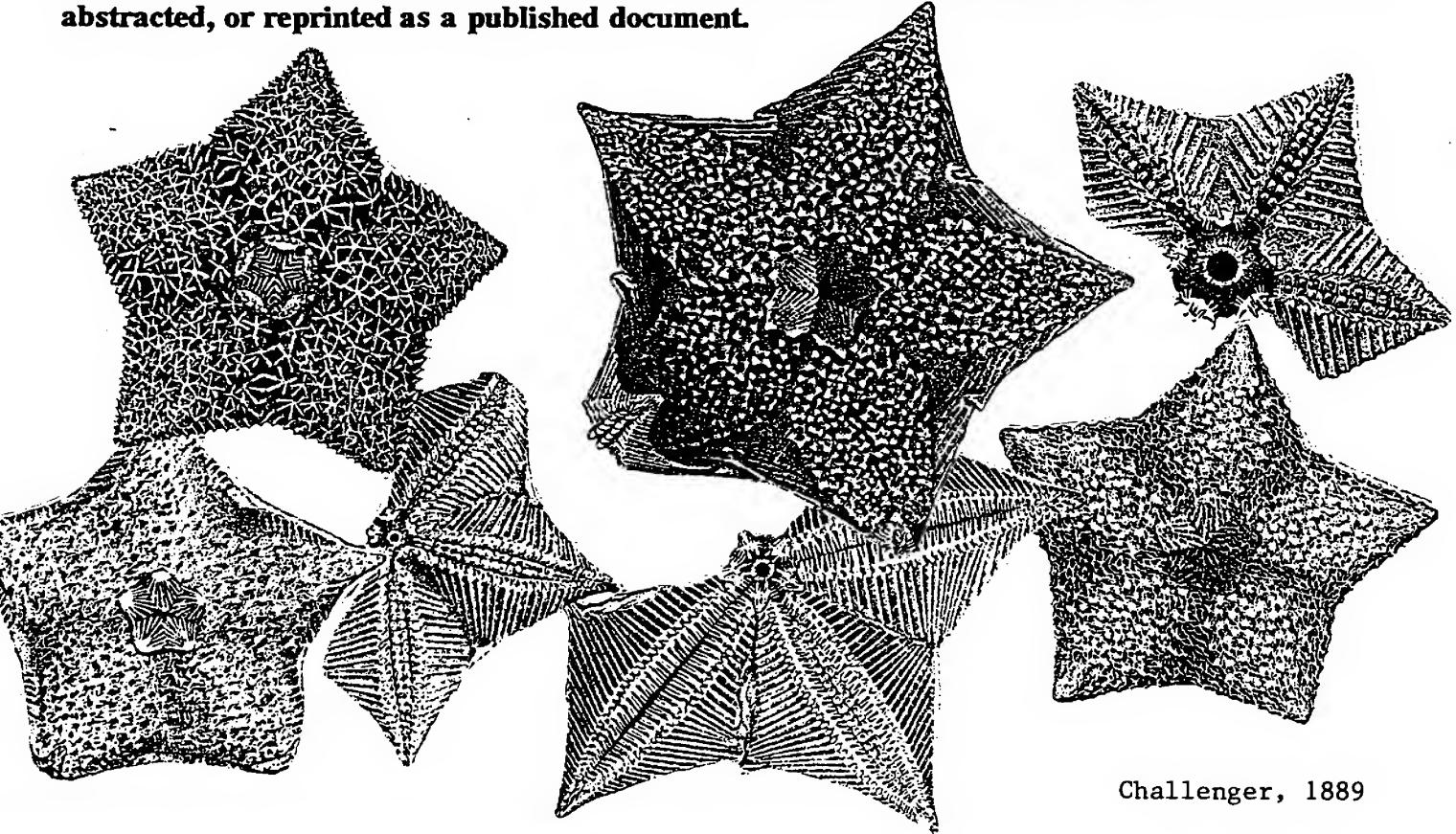
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**The newsletter contains information concerning meetings and conferences, publications of interest to echinoderm biologists, titles of theses on echinoderms, and research interests, and addresses of echinoderm biologists. Individuals who desire to receive the newsletter should send their name, address and research interests to the editor.**

**The newsletter is not intended to be a part of the scientific literature and should not be cited, abstracted, or reprinted as a published document.**



Challenger, 1889

## TABLE OF CONTENTS

### Echinoderm Specialists

#### Addresses

Phone (p-); Fax (f-); e-mail numbers.....1

Current Research.....27

Information Requests.....44

Suggestions, Announcements, Upcoming Conference.....45

#### Items of Interest

An Addendum to Mortensen's Monograph of the Echinoidea.....47

A Brief History of the Asteroidea.....48

Obituary -David Dilwyn John- from Whaling to Wales via Echinoderms.....49

Echinoderms in Literature.....50

How I Began to Study Echinoderms - Part 6.

    Steven M. Freeman.....50

    James B. McClintock.....51

Theses and Dissertations.....52

New Book Announcements.....55

Recent Echinoderm Publications.....58

Papers Presented at Meetings (by country or region)

    Asia.....73

    Canada.....73

    Caribbean.....74

    Europe.....74

    Mexico.....75

    Pakistan.....75

    Philippines.....75

    South America.....75

    United States.....76

Papers Presented at Meetings (by conference)

    Florida Echinoderm Festival, St. Petersburg.....77

    Symposium: The Role of Cell-Cell Interactions and Environmental

        Stimuli in the Development of Marine Invertebrates.....77

    Proceedings of the 1994 Workshop on the Management and Biology

        of the Green Sea Urchin (Strongylocentrotus drobachiensis).....78

    Sixty-sixth Annual Meeting of the Zoological Society of Japan.....79

    9TH International Echinoderm Conference, San Francisco.....81

Echinoderm Specialists 'Keyword' List.....91

Publications of H. Barraclough (Barry) Fell.....94

Letter to Editor (by C. Messing).....99

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\*\*\*\*\* CURRENT RESEARCH \*\*\*\*\*

ALI, M.S.M. - study of some Jurassic and Cretaceous echinoids of Sinai, Egypt.

ALLEN, J.A. - deep-sea benthos of the Atlantic.

ALLISON, W.R. - all aspects of *Culcita* spp. - feeding and foraging behaviour; habitat preferences and relationship to reef complexity (a scale problem); structuring effect on reef community; systematics. In process - Accuracy and precision of the line intercept and point quadrat approaches to reef surveys: the control of measurement error. Rapid reef survey methods for non-scientists.

ALVA, V. - trophic ecology of benthonic suspension organisms.

ANDACHT, T.M. - studying the mechanism of dorsoventral polarity disruption and inhibition of fertilization envelope elevation by nickel chloride in the sea urchin embryo, *Lytechinus variegatus*.

ARCHER, J.E. - reproductive biology, larval development and aspects of the ecology of the temperate holothurian, *Stichopus mollis* (for M Sc degree).

AUSICH, W.L. - Paleozoic crinoids.

BALSER, E.J. - development of the gonad in holothuroid echinoderms; function of the larval kidney in hemichordates and echinoderms.

BARTSCH, I. - parasites in brittle stars.

BASCH, L.V. - environmental effects on sea urchin (*Strongylocentrotus*) reproduction and development; influences of larval abundance and condition on settlement and recruitment of sea urchins; echinoderm larval nutrition; polar echinoid growth and secondary production; kelp forest ecology.

BAUER, J.C. - comparative study of the reproductive biology of the tropical echinoids *Diadema antillarum* and *Lytechinus variegatus* after exposure to internal bacterial disease (for a PhD degree from King's College London and Harbor Branch Oceanographic Institution).

BAUMILLER, T.K. - ecology and functional morphology of recent isocrinids; taphonomy of arms and stalks of articulates and advanced cladids vs. other Paleozoic taxa; diversity of Permian and Triassic crinoids and effects of the P/T extinction; patterns of turnover and extinction of Paleozoic crinoids; ecology of *Seirocrinus*; borings in Paleozoic pelmatozoans.

BAZHIN, A. - monitoring the condition of sea urchin populations (*Strongylocentrotus droebachiensis*, *S. polyacanthus*) along the Kamchatka peninsula shore.

BEAVER, H. - blastoid research.

BECKER, J. - marine invertebrates of Brazilian oceanic islands, including especially echinoderms.

BEGBIE, K.M. - studies on the hyponeural nervous system of the brittlestar, *Ophiura ophiura*.

BENEJAM DE SUAREZ, C. - occurrence of brooding *Amphiodia* sp. in Monterey Bay (California).

BENTLEY, A.C. - biology of the sand dollar, *Echinodiscus bisperforatus* along the southeastern coast of South Africa, encompassing growth, reproduction, genetics, larval biology etc.

BERENTS, P.B. - collection manager of marine invertebrates at the Australian Museum.

BERTRAM, D.F. - evolution and ecology of modes of development in echinoids.

BILLETT, D. - environmental impact on the deep sea; taxonomy of the genus *Mesothuria* (Holothurioidea).

BIRENHEIDE, R. - morphology, physiology and biomechanics of crinoids.

BIRYUKOVA, I.V. - chemoreception; chemosensory systems and its morphogenesis in the marine invertebrates.

BLAKE, D.B. - Cretaceous asteroids of Texas; Ordovician stelleroids; stelleroids of Seymour Island.

BOCKELIE, J.F. - Heliocrinids (cystoids) from Scandanavia and the Bathic; taxonomy, functional morphology and palaeoecology.

BORZONE, C.A. - bioecological study of *Mellita quinquesperforata* and *Encope emarginata* in beaches of Parana's state; influences of meteorological fronts in the structure of benthic macrofaunal communities in sandy beaches of Parana's state.

BOUDOURESQUE, C.F. - feeding behaviour of Mediterranean sea urchins; population dynamics and structure of Mediterranean echinoderms.

BOURGOIN, A. - studying the possibility of commercializing the green sea urchin *Strongylocentrotus drobachiensis* on the northeastern coast of New Brunswick.

BREGMAN, Y. - bioproductional properties (size-age structure, growth, recruitment, elimination, individual energy metabolism, energy balance, etc) and culture methods of local concentrations of commercial invertebrates (echinoderms and molluscs) inhabiting far-eastern coastal waters of Russia.

BRETON, G. - Mesozoic and Cenozoic asteroid evolution.

BROWER, J.C. - taxonomy, functional morphology, paleoecology, ontogeny and phylogeny of Ordovician crinoids from the northern midcontinent of North America; comparative ontogeny of Ordovician and Mississippian crinoids.

BUITRON-SANCHEZ, B.E. - Cenozoic echinoderms (Stelleroidea and echinoidea) from Baja California, Mexico.

BUSSARAWIT, S. - taxonomic study of echinoderms from the Andaman Sea, west coast of Thailand.

BYRNE, M. - life history evolution, echinoderm reproduction and development, ophiuroid functional morphology, echinoderm fisheries.

CALTAGIRONE, A. - sea urchin aquaculture.

CAMERON, R.A. - the specification of late cell types in sea urchin embryogenesis; development of the adult rudiment in larvae; genetic structure of sea urchin populations; a gene trap strategy to identify new upstream control regions for spatially restricted gene expression.

CAMPBELL, A. - sea urchin population dynamics ecology and fisheries.

CAMPBELL, A.C. - zoogeography of Indian Ocean echinoderms.

CAMPBELL, D.B. - feeding behavior of *Asterias*.

CANDIA-CARNEVAL, M.D. - crinoid arm regeneration; structure, physiology and biomechanics of complex musculo-skeletal systems (echinoid lantern, ophiuroid masticatory apparatus).

CHAO, S.-M. - population dynamics of the shallow-water holothurians of Taiwan; systematics of the echinoderms from Taiwan.

CHEN, C.-P. - ontogenesis of skeletal plate patterns, gonad and gonapores in the progenesisive *Sinaechinocymus mai*.

CINTRA, C. - working in Espiritu Santo Island and adjacent waters with the sea cucumber (*Isostichopus fuscus*). Our main purposes are: a) the determination of longitude and drain weight structure of the population under study; b) to estimate the rate, the curve and the individual growth equation with monthly data; c) to estimate the monthly and annual natural mortality rate; and d) the detection of presence and the determination of potential "banks" of the species. It is very important, because this organisms are considered as a species in danger of extinction, after a marked fisheries in different seas and is "protected" by the mexican government. The name of this project (with a study period of a year) is: "Biología poblacional de *Isostichopus fuscus* (Ludwig, 1875) (Echinodermata: Holothuroidea) en el sur del Golfo de California".

I am also working on my B. Sc. Thesis. This document contemplates the shallow water asteroids of the Gulf of California and the principal tentative objectives of it are: a) to realize a systematic and taxonomic study of the sea stars present in La Paz Bay; b) to make a key (at least to the genera level) of the asteroid species reported within the gulf; and c) to analyze the biogeographic patterns of the species found in the Gulf of California.

COLON-JONES, D.E. - rearing *Diadema* larvae; rearing coral larvae; studying the sediment regime on Biscayne National Park reefs; examining calcification rates of corals.

CONAND, C. - sea cucumber fisheries; bioerosion by sea urchins; influences of echinoderm populations on reef functioning.

CREASER, E.P. - state of Maine, commercial green sea urchin resource management, tag and movement studies along the Maine coast.

CRUMP, R.G. - asteroid development and ecology.

CUTRESS, B.M. - deep sea Holothuroidea (Echinodermata) of Puerto Rico.

DAFNI, J. - echinoid growth.

DAYTON, P.K. - benthic ecology.

DE RIDDER, C. - symbioses between bacteria (mainly sulfur-oxidizing bacteria) and spatangoids- reproductive biology.

DE WIT, W.M.J. - fossil echinoderms in fluvial and ice-age deposits of Holland.

DEARBORN, J.H. - functional morphology of ophiuroid tube feet; identification of Gulf of Maine and Antarctic ophiuroids and crinoids from collections on hand.

DEBENHAM, P. - population genetics of the red sea urchin *Strongylocentrotus franciscanus*

DIEHL, W.J. - effects of environmental stress on multilocus heterozygosity-growth relationships in invertebrates.

DOBSON, W.E. - population biology of *Ophiura sarsi* on continental slope off North Carolina; use of skeletal growth bands in ophiuroid ossicles as biological markers for sublethal predation and population ecology experiments.

DOLMATOV, I.Y. - mechanisms of regeneration, their formation and change; individual development of marine invertebrates.

DONOVAN, S.K. - writing a review chapter on the functional morphology of fossil echinoderms; documenting *Pseudocidaris* spines from a deformed Lower Cretaceous terrane in Hispaniola with Gren Draper and John Lewis; writing up the Pliocene echinoderms of the Bowden shell bed, Jamaica with Chris Paul; and ongoing research on the Jamaican Paleogene echinoids with Hal Dixon and others.

ELISEIKINA, M.G. - physiological and reparative regeneration of echinoderm internal organs.

ELLERS, O.W. - echinoid growth.

EMLET, R.B. - functional morphology of echinoderm larval evolution of echinoid life histories and development.

ETNIER, S. - comatulid crinoids.

ETTENSOHN, F.R. - systematics, paleoecology and functional morphology of the pelagic crinoid *Saccocoma*; paleoecology of an Ordovician *Ectenocrinus* garden.

EVDOMIKOV, V.V. - research of reproductive process of sea urchin; reproduction and development of marine invertebrates.

FAY, R.O. - Ovachita Belt bibliography.

FEDER, H.M. - Alaskan benthic systems of the Bering and Chukchi Seas (where sea stars are very common); the deep benthic system in Prince William Sound within and outside the oil-spill trajectory of the Exxon Valdez oil spill.

FERAL, J.-P. - structure of habitat and dispersal strategies; effects of developmental modes on genetic structure and evolutionary processes (mainly in echinoids - annelids and molluscs also used).

FERGUSON, J.C. - madreporite functions and water volume relationships in echinoderms - currently on echinoids and holothuroids.

FERNANDEZ, C. - growth, nutrition and biochemical composition of sea urchin *Paracentrotus lividus* in rearing fed with different types of artificial food.

FLAMMANG, P. - adhesive systems of echinoderm podia; ultrastructure, biochemistry of the adhesive and deadhesive substance, and adhesive force measurements.

FOSTER, M.W. - Ordovician echinoderms from western Virginia; Atlantic Ocean brachiopods; Antarctic and subAntarctic brachipods; paleobiology of Pennsylvanian invertebrates in Illinois.

FOX, D.J. - can genetic algorhythms be used to position a mechanical brittlestar arm?

FREEMAN, S.M. - impact and population dynamics of seastar predation on sublittoral communities. In particular, *Astropecten irregularis* on soft-bottom communities and *Asterias rubens* on commercial mussel beds, off the coast of Anglesea, North Wales; the relationship between the sea star *Astropecten irregularis* and its commensal polyniod *Acholoe astercola*.

FUKUYAMA, A.K. - looking at recovery of intertidal invertebrates in Prince William Sound, Alaska following the 1989 Exxon Valdez oil spill and am particularly interested in molluscan and echinoderm assemblages and the contrast in recovery patterns between areas that were treated with hot-water, high pressure treatment with areas that were oiled and untreated.

GAGE, J.D. - ophiuroid growth markers (inshore (deep-sea), deep-sea benthic population dynamics, community ecology and regional zoogeography in Rockall Trough area; deep-sea benthic environmental sensitivities to oil/gas related developments; deep-sea echinoid and holothurian taxonomy

GAGNON, J.-M. - Arctic *Strongylocentrotus* spp.

GALLEMI, J. - Cretaceous echinoids (Tethyan - worldwide); systematics, biostratigraphy and palaeoecology.

GENTIL, F.A. - population dynamics of ophiuroid species in soft-bottom community of the English Channel.

GIBSON, M.A. - echinoderm paleoecology of the Lower Devonian of west Tennessee; epibiont paleoecology.

GIUDICE, G. - regulation of the synthesis of heat shock proteins in sea urchin embryos; molecular mechanisms of the establishment of embryonic axes in sea urchins; developmental toxicology in sea urchins; ribosomal RNA synthesis in sea urchins.

GLUCHOWSKI, E.L. - Genus *Haplocrinites* (Inadunata) from the Devonian of Poland.

GOGGIN, L. - diseases of starfish as a method of biological control.

GOLDBERG, A.S. - investigating antiarthritic properties of echinoderms.

GOODING, R.U. - animals associated with Caribbean diadematids; animals associated with diadematid echinoids, worldwide.

GRABOWSKY-KAAIA, G.L. - Albatross recolonization project via the Audubon Society and HI Dept. of Fish and Wildlife.

GREENSTEIN, B.J. - taphonomy of crown-of-thorns starfish; comparative taphonomy of caribbean reefs; mode of formation of Pliocene shell beds.

GROSJEAN, P. - sea-urchins cultivation; growth in controlled conditions; digestion process; effect of temperature, light, quality and quantity of food; model of growth of sea urchins.

GROVES, C. - *Heliaster* biogeography and systematics.

GRYGIER, M. - production of Myzostomida chapter for Vol. 4 of "The Fauna of Australia"; preliminary survey of myzostomes removed from crinoids in the Australian and Western Australian Museums; examination of long-lost Caribbean Myzostomida types at the Museum of Comparative Zoology; preliminary survey (with Igor Eeckhaut) of Myzostomida from comatulids in northern New Guinea; participation in UCSB survey of parasites of seastar *Asterias amurensis* in central and northern Japan; planned for 1996: taxonomic study of Myzostomida of Japan and the Ryukyu Islands; work up collection of Japanese Scottomyzon copepod ectoparasitic on *Asterias amurensis*; finish manuscript with Van Den Spiegel on taxonomy of parasitic barnacles (Microlepadidae) from *Diadema* in Singapore; work address from March 1996 through February 1997 is - University of the Ryukyus Tropical Biosphere Research Center, Sesoko Station, 3422 Sesoko, Motobu-cho, Okinawa 905-02 Japan - ph. 81-980-47-2888 - fax 81-980-47-4919.

GUENSBURG, T.E. - edrioasteroids, early crinoids, paleoecology of echinoderms.

GUERRAZZI, M.C. - natural history and the feeding behavior of the starfish *Echinaster brasiliensis*.

GUILLOU, M. - REPRODUCTION/RECRUITMENT: responses of sea-urchin population to environmental changes; BIODIVERSITY: seaweed-urchin interaction.

GURREA, I. - echinoids from the Cretaceous and Cenozoic age, Mediterranean region (specifically Western Europe).

GUTT, J. - Antarctic and Arctic benthos.

HADEL, V.F. - respiratory metabolism of *Chiridota rotifera* (small holothuroid found in beaches of coarse sand).

HAGEN, N.T. - sea urchin outbreak dynamics: ecological interactions in a macroparasite/sea urchin/ kelp forest system. Echiniculture/closed cycle cultivation of sea urchins: broodstock management, photoperiodic control of gametogenesis, growth, feeding, design of cultivation equipment.

HAMZA HASSAN, M. - ecology and biology of echinoderms from Gulf of Suez - Red Sea.

HAVARDSSON, B. - the effect of caroteins in feed and environmental temperature on the gonad color and gonad development of the sea urchin *Strongylocentrotus drobachiensis* (Mueller, 1776). The purpose of the experiment is to develop feed suitable for controlling the quality of the urchin gonad in echinoculture.

HAY, M.E. - 1995-2000 National Oceanic and Atmospheric Administration. "Human Environmnetal Linkages in the South Florida Coastal Ecosystem: Effects of Natural and Anthropogenic Stressors" (M. Harwell and 26 Co-Principal Investigators).

HEINZELLER, T.E. - comparative, mainly neuroanatomical, morphology (TEM, histochem.) of crinoids with special attention to milleri-, bourgeti- and cyrtocrinids; entoparasitic myzostomids of crinoids, mutual effects on host and parasite on an ultrastructural basis.

HENDLER, G.L. - behavior and functional morphology of deep-sea ophiuroids; taxonomy of Okinawan ophiuroids (with S. Irimura); systematics and natural history of eastern Pacific ophiuroids.

HERDENDORF, C.E. - invertebrate fauna associated with deep-sea (> 2000 m) shipwrecks; invertebrate fauna of New Zealand (North Island) estuaries and tidal flats; brisingid fauna of North Atlantic Ocean; echinoid (esp. sand dollars) invasion of New Zealand estuaries following diversion of freshwater inflow.

HESS, H. - cyrtocrinid crinoids from Lower Jurassic of southern Switzerland; scyphocrinids from the Upper Silurian of Morocco.

HILL, R.B. - holothurian muscle physiology, local degeneration.

HODGSON, A.N. - reproductive biology of marine invertebrates including echinoderms.

HOLTERHOFF, P.F. - Late Paleozoic crinoid paleoecology and systematics; P-Tr extinction and eradication of the Crinoidea.

HOOPER, R.G. - development of sea urchin aquaculture method; ecology of *Strongylocentrotus drobachiensis*.

HOROWITZ, A.S. - bibliography of the fossil Blastoidea and database of blastoid taxa (with J. Waters).

HOSHI, M. - molecular mechanism of sperm-egg interactions in starfish and sea urchins; structure and function of glycosphingolipids in starfish and sea urchins; 1-methyladenine signal transduction in starfish oocytes.

HOTCHKISS, F.H.C. - larval homeomorphism, Loven's law and adult ray homologies in echinoids, ophiuroids and edrioasteroids; isolated ophiuroid vertebrae and ossicles from Devonian, Bohemia (with Petr & Prokop); Paleozoic ophiuroid morphology & evolution; teratology of sea stars; tetramerism/hexamerism in echinoids and stelleroidea; relation of larval axis to adult axis symmetry.

HOTTENROTT, S.I. - systematics and cladistic analysis of *Ophiomusium* and *Ophiosphalma*; preliminary notes on a troglobitic ophiuroid from the Bahamas.

IRIMURA, S. - taxonomy of Japanese Ophiuroidea; SEM observation on disk granules of Ophiuroidea.

IVY, W.G. - seed production and sea ranching of sea cucumbers.

JABLONSKI, D. - onshore-offshore and latitudinal patterns in the origins of higher taxa, and their subsequent shifts in environmental and latitudinal distribution; studying post-Paleozoic echinoids and stalked crinoids; studying mainly molluscan but some echinoid mass extinction and recovery patterns, especially at the Cretaceous-Tertiary boundary.

JACOBSEN, N.A. - identification and logging of occurrences of invertebrates, vertebrates and geologic features in the Monterey Bay; working especially with asteroidea analysis (WWW images and information will be available in the near future).

JAECKLE, W.B. - nutrient distribution among tissue in larvae; asexual reproduction by asteroid larvae.

JAGT, J.W.M. - Late Cretaceous and early Palaeocene crinoids, ophiuroids, asteroids and echinoids from the type area of the Maastrichtian Stage (southeast Netherlands, northeast Belgium) with emphasis on K/T boundary transition.

JAMES, D.B. - Seed production in sea cucumbers.

JAMIESON, G.S. - sea urchin abundance surveys; near-shore community population dynamics.

JANIES, D.A. - phylogenetic analyses of the evolution of development among asteroids.

JELL, P.A. - Australian fossil echinoderms - Cambrian to Tertiary (excluding Tertiary echinoids) particularly, 1. Silurian & Devonian crinoids & asteroids, 2. Permian crinoids, 3. Carboniferous crinoids.

JOHNSEN, S. - further investigation of the nature and mechanism of the extraocular sensitivity to polarized light in the ophiuroid *Ophioderma brevispinum*; biochemical, molecular and immunohistochemical study of the nature and distribution of the visual pigment in *Asterias forbesi* and *Ophioderma brevispinum*.

JUNQUEIRA, A.O.R. - population dynamics of echinoids.

KELLY, M.S. - feasibility of commercial echinoculture in Scotland (*Psammechinus miliaris*); echinoderm/subcuticular bacteria symbioses.

KEUSKAMP, D. - recruitment of the endemic New Zealand echinoid *Evechinus chloroticus* (Echinometridae). Specifically focussing on settlement variability, natural recruitment variability, and experimental manipulation of processes operating immediately post-settlement (using cultured recruits), as well as aspects of development and the chemical ecology of settlement. Especially interested in the effects of sediment on survivorship during and after settlement, and techniques available to determine the nature of these effects. Also, the peculiarities of a marine reserve (as my major study site). Determining the relative influence these processes have on recruitment at several scales may have implications for the (small) roe fishery in New Zealand.

KLINGER, T.S. - nutrition of echinoids; feeding and ecology of holothuroids; digestive enzymes of echinoids and holothuroids.

KOBAYASHI, N. - marine pollution bioassay by using sea urchins; spawning periodicity of sea urchins.

KOGO, I. - crinoidea (living); its classification and distribution in western Pacific.

KURIHARA, T. - spatial distribution of starfishes; accuracy in estimating organism density with quadrat; endurance of mark on starfish.

LAMBERT, P. - an identification handbook to shallow water sea cucumbers of southeastern Alaska, B.C. and Puget Sound.

LANE, D.J.W. - The Echinodermata: a biological tool for the control and protection of marine benthic environments in Singapore waters.

LAWRENCE, J.M. - characteristics of arm regeneration in starfish; comparative nutrition of sea urchins.

LE MENN, J. - North African Paleozoic crinoids; benthic communities and sequential stratigraphy.

LeCLAIR, E.E. - ophiuroid arm skeletal morphology and biomechanics.

LEISMAN, J. - recruitment study of brittlestars in the Banana River; also, aspects of regeneration.

LESSER, M.P. - urchin aquaculture - use of photoperiod to manipulate gametogenesis in *Strongylocentrotus drobachiensis*.

LESSIOS, H.A. - molecular phylogeny of *Diadema*; gene flow in sea urchins; population dynamics of *Diadema antillarum*; effects of sea urchins on coral recruitment.

LEVERONE, J.R. - reproductive cycles of *Astropecten* and *Luidia* in lower Tampa Bay.

LEVITAN, D.R. - ecological and evolutionary consequences of sperm limitation in echinoderms; echinoid grazing pressure in the Caribbean.

LIAO, Y. - fauna Sinica: Ophiuroidea.

LITVINOVA, N.M. - revision of the genus *Ophiomyces* (Ophiacanthidae); new species and genus *Ophiuraster* (Ophiuridae); ophiuroids of New Caledonia.

LORDSON, J. - seed production and sea ranching of sea cucumbers.

LOVELY, E.C. - coexistence of hydroid predators in *Tubularia larynx* colonies.

LUCAS, J.S. - *Acanthaster planci* larvae and juvenile biology.

MACURDA, JR., D.B. - skeletal morphology modern crinoids.

MACZYNSKA, S.S. - Cretaceous and Tertiary echinoids particularly from Poland.

MAH, C.L. - a revision and phylogeny of the Brisingida, a group of unusual deep-sea asteroids; describing a new species of *Brisingella* from the Monterey Bay; visited the Smithsonian (June 1995) and found many lots of brisingids that may show different growth stages; a Pleistocene *Ctenodiscus crispatus* Retzius from Humboldt County, California (in prep).

MAIER, M. - studying asterosaponins.

MAKRA, A. - *Acrocnida brachiata* (Ophiuroidea) in Little Killary Bay, west coast of Ireland; population dynamics, reproductive biology, regeneration, bioturbation.

MALLEFET, J.C. - luminescent ophiuroids; morphological, physiological, ecological aspects.

MANNI, R. - systematics, morpho-functionality and evolution of Mesozoic non-isocrinid crinoids.

MANNFIELD, K. - Dinantian crinoids from northwest Ireland; exploring Camerate ?extinction; crinoid palaeoecology, autecology and palaeobiology; also looking at carbonate reefal environments etc.

MARCOS-DIEGO, C. - study of benthic fauna and flora from the southern of the Livingston Island (South Shetland, Antarctica).

MARSH, L.M. - revision of *Nardoa* and *Gomophia* (Asteroidea: Ophidiasteridae) - with F.W.E. Rowe; echinoderms of the northwest shelf of Western Australia.

MASCARENHAS, B.J DE A. - pattern of distribution of asteroidea from Guanabara Bay, Rio de Janeiro, Brazil.

MASSIN, C. - holothurian taxonomy; Easter Island, Indonesia, Papua New Guinea.

MATERIA, C.J. - ecological study of invertebrate and plant communities at a proposed sand mining site on King Island, Tasmania, Australia.

MATTOS-SEGOVIA, E. - the assessment of bioinducers of the settlement in larvae of sea urchin *Loxechinus albus*.

McCLINTOCK, J.B. - chemical ecology of echinoderms from the Gulf of Mexico and Antarctica.

McKENZIE, J.D. - subcuticular bacteria in echinoderms; antifouling mechanisms of echinoderms.

MCLELLAND, J.A. - ophiuroids and holothuroids from near coastal areas of northeastern Gulf of Mexico, Florida coast, and West Indies; ecology and taxonomy.

McNAMARA, K.J. - Neogene species of the clypeasteroid *Peronella* from Western Australia; Paleocene spatangoids from the Carnarvon Basin, Western Australia; Miocene echinoids from the Carnarvon Basin, Western Australia; Eocene echinoids from the Bremer Basin, Western Australia; fauna of Australia -spatangoids, holasteroids, clypeasteroids, cassiduloids (with Rich Mooi); general echinoid morphology, physiology and biogeography.

MEDEIROS-BERGEN, D.E. - molecular identification of echinoderm larvae transport, dispersal and small scale hydrodynamics of sea cucumber larvae.

MEIJER, L. - cell division cycle control using starfish oocytes and sea urchin eggs; anti-mitotic drugs discovery using purified kinase from starfish oocytes.

MESSING, C.G. - ecology and taphonomy of western Atlantic stalked crinoids; ecology, taxonomy and phylogeny of comatulid crinoids.

MEYER, C.A. - paleoecology of starfishbeds in the Tertiary of the Vienna Basin (Austria); taxonomy and paleoecology of Upper Jurassic echinoderms from the Swiss Jura mountains.

MIRONOV, A. - taxonomy and biogeographic history of recent holasteroid echinoids.

MITROVIC-PETROV, J.R. - study of some Cretaceous and Neogene echinoids of Serbia (taxonomy, paleoecology, functional morphology, taphonomy).

MLADENOV, P.V. - parthenogenesis in brittle stars; reproductive biology of echinoderms in New Zealand fiords; reproductive biology of Fijian echinoderms; environmental factors influencing asexual reproductive processes in echinoderms; population genetics of asexual echinoderms; morphological and genetic variation in *Amphipholis squamata*.

MORRILL, J.B. - gastrulation in the sea urchin, *Lytechinus variegatus* and *Echinometra* sp.

MOTOKAWA, T. - catch connective tissue (mechanics, morphology, physiology); biology of stalked crinoids; neuropeptides of echinoderms.

MOUCHATY, S. - molecular systematics of the Mellitidae.

MUKAI, H. - ecosystem study in tropical and boreal seagrass beds; bioturbation and restructural effects on material flow at interface of sea floor.

NAIDENKO, T.K. - cryopreservation of sea urchin embryos and larvae bioassay by using sea urchin eggs and embryos.

NAKAMURA, R.K. - involved with AQUAVAN, an educational outreach program for the Vancouver Aquarium. I travel around the province of British Columbia bringing seashore life, including sea stars, sea urchins and sea cucumbers into schools to teach children about aquatic conservation.

NAKANO, E. - extracellular matrix in the sea urchin embryo.

NEBELSICK, J.H. - taphonomy of reef echinoids; Lower Miocene echinoid palaeobiogeography.

NEILL, B.J. - biogeography, systematics and population biology of echinometrids.

NESTLER, H. - Cretaceous echinoids.

NEUMANN, C. - phylogeny and paleoecology of Toxasterid echinoids; echinoids and gastropod predation; Cretaceous echinoids from the Betic Cordillera (Spain); functional morphology of Cretaceous echinoids.

NICHOLS, D. - seasonality in the New Zealand crinoid *Oxycomanthus plectrophorum* (with P.V. Mladenov, Otago, N.Z.); reproductive cycle in *Luidia ciliaris* from the English Channel.

NICOSIA, U. - systematics and palaeoecology of Jurassic crinoids; evolution and stratigraphy of non-isocrinids.

NISHIHARA, M. - effect of heart urchins on coral community structure of the sandy bottom.

O'CONNOR, B.D. - bioturbation rates of infaunal echinoderms; connection between hydrographic features and high density ophiuroid populations.

O'HARA, T.D. - echinoderms of Macquarie Island (final stages); patterns of diversity for faunal assemblages on subtidal reefs off central Victoria (Ph.D. thesis, University of Melbourne).

OJEDA, F.P. - abundance and distribution patterns of subtidal macroinvertebrates of South Bay, Doumer Island, Antarctica.

OJI, T. - paleontology and biology of stalked crinoids; especially regeneration of crown and arms, and evolutionary history of isocrinines.

OLSZEWSKA-NEJBE, D. - irregular echinoids (particularly the genera *Micraster* and *Echinocorys*) from the Poland and western Kazakhstan, comparison of the Turonian-Coniacian irregular echinoids in the North European Province; paleobiogeography of irregular echinoids during the Late Cretaceous.

OLVER, J. - Mesozoic irregular echinoids; extant British species.

PABIAN, R.K. - Late Pennsylvanian crinoids, systematics, paleoecology, biostratigraphy.

PAGETT, R.M. - Caspian Sea: literature review.

PARDO, R.A. - ecology and population dynamics of echinoderms (particularly echinoids and ophiuroids) - currently, population dynamics of sand dollars.

PARMA, G. - fossil echinoids.

PAULS, S.M. - inventory of species and bibliography of the echinoderms from Venezuela, South America.

PENCHASZADEH, P.E. - ecology of sand dollars (*Mellita* spp); trophic ecology of asteroids.

PENNINGTON, J.T. - primary production in the central California upwelling zone; brachiopod larvae of the Monterey Bay Submarine Canyon.

PEREZ-RUZAFA, A. - wetlands and coastal lagoons of Galapagos Islands (Ecuador) - basis for its protection and management; Iberic fauna; study of benthic fauna and flora from the southern of Livingston Island (South Shetland, Antarctica); design of new algorithms for the primary productivity and water quality prediction in coastal zones using remote sensing techniques.

PETR, V. - an internal grant award from the Grant Agency of Charles University, n. 134/94 (years 1994-1996): "Trace elements in crinoid skeletal remains (Echinodermata) from the weathered limestones of the Bohemian Lower Devonian (Barrandian area)" with co-authors: M. Mihaljevic, O. Sebek, R.J. Prokop. The crinoid ossicles studied come from the so-called "white beds" of the Barrandian area (highly weathered limestones) which originated, probably by ground water solution, from fine grained Upper Silurian and Lower to Middle Devonian limestones along zones of tectonic faulting. In the "white beds", the original limestone cement is highly weathered, disintegrated and decalcified. On the contrary, all the echinodermal skeletal elements are invariably low-magnesian calcite. It is important to point out that in the true "white beds" the echinodermal ossicles are always present, typically well-preserved and frequently show the original stereom. The preservation of stereom is of great importance for

palaeobiology because its microstructure reflects particular kinds of original soft tissue in these plates. Although such a natural developing of ancient stereom is very probably a world-wide phenomenon, practically no attention was given to it outside Bohemia and was partly unknown or supposed to be extremely exceptional. This project includes studies in geochemistry, biogeochemistry, biominerilization and isotope geology.

PHILIPPE, M. - Miocene echinoids in the Mediterranean domain.

PIEPENBURG, D. - densities and distribution of brittle stars in the Laptev Sea.

PIESSE, C.C. - systematics of New Zealand starfish.

PODOLSKY, R.D. - effects of temperature and viscosity on fertilization and larval biology, especially in echinoids.

PORTELL, R.W. - miocene echinoids of Florida.

PRESTEDGE, G.K. - study of Pittwater, S.E. Tasmania, re: the regrowth of *Zostera* sp., also *Codium* sp. beds now that nutrient levels in the water have decreased with upgrading of local sewerage treatment plants, and to see if several species of echinoderms return if the above species of algae recover sufficiently.

PROKOP, R.J. - new implications for palaeobiology of float-bearing crinoids from the Bohemian Upper Silurian - Lower Devonian; genus *Pygmaeocrinus* Bouska (Crinoidea) in the Devonian of Barrandian (Czech Republic) with Dr. V. Petr.

- 1) participation in the project "Czech Ordovician as a World Standard" - for first result see Mikuláš - Petr - Prokop (1995) in current publications (this issue of newsletter) (Grant Award from the Grant Agency of the Czech Republic). 1994-1996.
- 2) preparation of a report on the first found of the genus *Lampterocrinus* Roemer, 1860 (Crinoidea, Camerata) in the Bohemian Silurian.
- 3) preparation of the revision of the genus *Pygmaeocrinus* Bouška, 1946 (Crinoidea, Inadunata) in the Bohemian Devonian.
- 4) interpretations of the geochemical and isotope results of investigations of crinoid skeletal elements from the Upper Silurian and Lower to Middle Devonian of the Barrandian area (Grant Award from the Grant Agency of Charles University). 1994-1996.

RAJAKUMAR, C.P. - ecology, seasonal variation, population dynamics and distribution pattern of echinoderms of South-west coast of India.

REGIS, M.-B. - population dynamics of regular echinoids in the Mediterranean; enzymatic study of the nutrition of *Paracentrotus lividus* (Echinodermata: Echinoidea).

REICH, M. - fossil holothurians, especially on Campanian/Maastrichtian holothurian sclerites from Northern Germany, Denmark and England, and furthermore on Jurassic holothurians from Thuringia and Harz Mts. (Germany).

REY, D. - Creataceous and Tertiary echinoids of Spain.

ROBINSON, S.M.C. - green sea urchin fishery ecology; roe enhancement of the green sea urchin;

development of artificial diets for sea urchins.

ROCCATAGLIATA, A.J. - chemistry of physiologically active compounds isolated from starfishes and brittle stars in the South Atlantic Ocean.

RODRIGUEZ, S.R. - subtidal brown macroalgae forests as food sources for intertidal organisms: role in determining community patterns in the rocky intertidal environment.

ROGERS-BENNETT, L. - examining the impact of larval feeding history on the growth and success of newly settled red sea urchins; examining the survival of newly settled urchins exposed to micro-predators in the benthos; spatial patterns in the growth and survival of juvenile red abalone.

ROSE, E.P.F. - Jurassic irregular echinoids; Cenozoic holocarpoid echinoid *Echinoneus*.

ROTMAN CLARK, H.E.S. - systematics of Southern Ocean asteroids and ophiuroids.

ROUX, M. - stalked crinoids: Jurassic to Recent; ontogeny; taxonomy of modern bathyal and abyssal stalked crinoids; bathyal ecology.

ROWE, F. - Indo-west-Pacific echinoderms and their systematics and zoogeography.

SABA, M. - taxonomic studies of Japanese sea-stars.

SANFORD, E. - foraging behavior, recruitment, and growth of *Pisaster ochraceus*.

SASTRY, D.R.K. - echinoderms of coral reefs.

SCALLY, K. - tooth form function and evolution of invertebrate dental systems, especially tooth sharpening behaviour (thegosis).

SCHELTEMA, R.S. - distribution of echinoderm larvae in Antarctic waters, specifically in vicinity of South Shetland Islands - Bransfield Strait etc.

SCHOPPE, S. - echinoderms of Leyte, Philippines; coral reef protection and rehabilitation; interspecific relationships; biodiversity.

SCHUETZ, A.W. - development of a new model for multiparameter analyses of perturbations of gametic and embryonic processes.

SEETO, J. - taxonomy of Fiji holothurians.

SERAFY, D.K. - zoogeography of Atlantic echinoids.

SHEPHERD, S.A. - food web studies; comparison between abalone and sea urchins.

SHIRLEY, T.C. - predator-prey and competitive interactions between sea otters, crabs and starfish in Glacier Bay, Alaska.

SIBUET, M. - taxonomy and ecology of deep sea echinoderms.

SINGLETARY, R.L. - ecology of the seastar *Asterias forbesi*.

SKOLD, M. - population dynamics, growth, regeneration, feeding and predator-prey interactions in brittle stars; structuring mechanisms in marine benthic populations; interactions between burrowing heart urchins (*Brissopsis lyrifera*) and brittle stars (*Amphiura chiajei*); passive suspension feeding in *Amphiura filiformis* (Echinodermata: Ophiuroidea).

SLOAN, N.A. - sea cucumber fisheries.

SMILEY, S. - annotated catalogue of holothurians with synonymies; annual cycle of *Parastichopus californicus*, changing conditions of body wall muscles.

SMIRNOV, A.V. - deep-water holothurians from New Caledonia; Arctic and North Pacific echinoderms fauna; taxonomy of apodid holothurians.

SMIRNOV, I.S. - taxonomic studies of arctic and antarctic ophiuroids, creation of illustrated computer key for arctic brittle-stars and data bases on ophiuroids of Arctic and Southern Oceans.

SMITH, A.C. - pathology; phylogenetic connections to protochordates and vertebrates; immunology; hematology; body fluids as possible diagnostic reagents.

SMITH, A.B. - morphological and molecular phylogenies of echinoderms; Maastrichtian and Palaeocene echinoids.

SOLIS-MARIN, F.A. - evolution of echinoids; taxonomy of the phylum.

SOLOVJEV, A.N. - Holasteroid and spatangoid echinoids (evolution, classification, paleoecology); echinoids on the Cretaceous/Paleogene boundary.

SONNENHOLZNER, J.I. - taxonomic study on echinoderms from the Ecuadorian coast; distribution and abundance of echinoids and ophiuroids intertidally in Santa Elena Bay, El Guayas, Ecuador; ecology and biology of *Tripneustes depressus* in Machalilla National Park, Manabi; ecology of sand dollars (*Encope micropora*) in shallow waters from El Guayas, Ecuador.

STAMPANATO, S. - Antarctic starfish.

STANCYK, S.E. - population biology, predation and regeneration of *Ophiura sarsi*; sublethal predation of echinoderms; use of markers and growth rings of ophiuroid ossicles for age/growth studies.

STEWART, B.G. - biology of the euryalid snake star *Astrobrachion constrictum*.

STICKLE JR., W.B. - the systematic status, zoogeographical distribution, and environmental physiology of sea stars belonging to the Leptasterias species complex; focusing on species differences in the adaptation to a freshwater lens system that develops annually at Little Port Walter, southern tip of Baranoff Island, southeastern Alaska (with Jeff Tamplin, Ph.D. Student).

STORC, R. - ophiuroids from the Upper Cretaceous (Cenomanian-Turonian) of the Bohemian Cretaceous Basin (Czech Republic).

STRATHMANN, R.R. - developmental plasticity of larvae; limits on the aggregation of embryos; evolution rates of development of embryos.

STUMP, R.J. - population dynamics of *Acanthaster planci* (L.).

SUMIDA, P.Y.G. - ecology and ontogeny of the post-larval development in deep-sea ophiuroids.

TABLADO, A. - systematics of Asteroidea from southwestern Atlantic and Antarctic Peninsula.

TAHERA, Q. - systematics, taxonomy of echinoderms of the Arabian Sea.

TAKAHASHI, K. - physiology of the madreporite; physiology of echinoid spine muscle and catch apparatus; motile mechanism of echinoderm sperm flagella.

TAVARES, Y.A.G. - ecology, histology, morphology studies of *Mellita quinquesperforata* in beaches of Parana's State, relation between morphodynamics and spatial distribution.

TELFORD, M. - collagen in tooth support mechanism of clypeasteroids; podial forces in *Asterias*; computer simulation of *Dendraster* distribution.

THANDAR, A.S. - study of new records of shallow water holothuroids from the South African east coast.

THIERRY, J. - systematics, morphology, evolution, ecology, palaeobiogeography, biostratigraphy and biometrics-shape analysis of Jurassic irregular echinoids.

THORSEN, M.S. - the ecophysiology of the irregular sea urchin *Echinocardium cordatum* - interactions with gut microbiota.

TOMINAGA, H. - biology of the sand dollar, especially key-hole urchins: *Echinodiscus tenuissimus* and *Astriclypeus manni* in Japan, encompassing population study, growth, development, age determination etc.

TRONCOSO, J.F. - identifying collections of Antarctic echinoderms in the Natural History Museum of Concepcion, Chile; studying several species of echinoderms from the Pacific coast Eight Region; the conservation problems of the echinoderms of Chile and their future projection.

TUTERA, P. - monograph of the irregular echinoids of Prydz Bay, Antarctica; new *Pachycentrotus* species

UBAGHS, G.J. - Upper Cambrian echinoderms from the Montagne Noire (southern France).

v.JUTERZENKA, K. - ecology of Arctic ophiuroids; ecology of the marginal sea of the eurasian Arctic (German -Russian investigators; GRIEMSEN).

VADAS, R.L. - ecology and reproductive biology of sea urchins along the coast of Maine. Funded by NOAA Sea Grant (1995-1997); temporal and spatial variability in reproduction and roe yield in green sea urchins. Tentatively funded by Maine Dept. Mar. Res. (1996-1997).

VADET, A. - Triassic echinoids of St. Cassian; revision of all the Jurassic echinoids.

VALENTINE, J. - role of sea urchins in structuring seagrass productivity.

VAN DER HAM, R.W.J.M. - *Hemiasster* and *Echinogalerus* of the Upper Cretaceous of NW Europe.

VANDENSPIEGEL, D. - the defensive mechanism of the Echinodermata: structure and functions of the Cuvierian tubules.

VIKTOROVSKAYA, G.I. - reproduction of invertebrates in artificial and natural conditions.

VISTISEN, B.K. - studying the two brittle stars *Ophiura albida* and *Amphiura filiformis* concerning their tolerance towards hypoxi with and without the presence of hydrogenesulphide.

WAREN, A.H. - gastropods parasitic on echinoderms.

WASSON, K. - reproduction and factors that control reproduction in echinoids.

WATTS, S.A. - steroid metabolism in echinoids.

WEBSTER, G.D. - Late Devonian crinoids and asterozoans (with Dan Blake and Dan Hafley) from west central Colorado; Osagean crinoids from western Montana; middle Pennsylvanian crinoids from northwestern Colorado (with Karen Honck); continue tabulation of Paleozoic crinoids and coronates for bibliography and index.

WELSCH, U. - innervation of the juxtaligamental cells in crinoids; analysis of the connective tissue of crinoids.

WILKIE, I.C. - functional morphology and mechanics of the echinoid lantern; functional morphology and mechanics of the ophiuroid mouth-frame; organisation, mechanics and physiology of echinoderm connective tissues; autotomy mechanisms of echinoderms and other invertebrates.

WILLCOX, M.S. - molecular phylogeny of asteroids; genetic basis to salinity adaptation in asteroids.

WORHEIDE, G. - actuopaleontology and ecology of *Astrosclera willeyana* Lister 1900 (Demospongiae) (for Ph.D. thesis); taphonomy of coral reef echinoids.

WRAY, G.A. - evolution of body-patterning genes in echinoderms; evolution of echinoderm larvae; phylogeny of echinoids.

YANAGISAWA, T. - larval development from plutei to metamorphosis of the sea urchins in the Ogasawara (Bonin) Islands.

YOSHIZATO, K. - molecular evolution of invertebrate collagen.

ZAVODNIK, D.V. - fauna and flora of the Adriatic Sea - Echinoderm distributional patterns.

ZITT, J. - crinoids (Cyrtocrinida, Isocrinida, Comatulida, Roveacrinida) from the Lower Cretaceous of the Moravian Carpathians and Upper Cretaceous of the Bohemian Cretaceous Basin (main emphasis to taphonomy); echinoids from the Upper Cretaceous of the Bohemian Cretaceous Basin (Cenomanian-Turonian Boundary interval).

\*\*\*\*\* INFORMATION REQUESTS \*\*\*\*\*

Bauer, J.C. - information on bacterial diseases in echinoids would be greatly appreciated. Also any effects of increased sea-water temperatures on these diseases would be helpful.

Benejam de Suarez, C. - requests information on the occurrence of any brooding *Amphiodia* along the California coast, northward.

Feder, H.M. - (1) would like to make contact with anyone working with asteroid or ophiuroid feeding biology and ecology in subarctic regions; (2) my work in the Bering and Chukchi Seas suggests that asteroid abundance increases to the north of these areas as fish predation decreases. Cold water on the shelf of these seas precludes movement of bottomfishes there in most years which appears to increase food availability on the bottom for sea stars. The original observation of this was by Dr. A.A. Neiman in 1963 when she worked in the eastern Bering Sea. I find large numbers of sea stars (mainly *Asterias amurensis* but also *Leptasterias polaris* and others) in the southeastern Chukchi Sea where large numbers of bottom-feeding fishes seldom occur. I would like to make contact with anyone familiar with this observation who would be interested in pooling information for development of a paper for publication.

Feral, J.-P. - would appreciate to receive 70-80% ethanol fixed ovaries of *Echinocardium* spp. from anywhere in the world, and of *Sterechinus* spp. and brood-protecting schizasterids from Antarctic. Alcohol should be of "good" quality. Specimens should also be fixed in ethanol. A label should give identification (if possible), place of sampling with depth and substrate (with latitude and longitude if possible), date of sampling. The purpose is to extract DNA for sequencing to reconstruct phylogenies.

Hottenrott, S.I. - would be grateful for specimens of the deep sea genera *Ophiomusium* and *Ophiosphalma*, especially type material. Information on collecting localities and depth is also valuable, as are reprints of any current research (ecology, behavior, genetics, etc.) involving these groups. Also any information on (or reports of) troglobitic (cave dwelling) echinoderms.

Jaeckle, W.B. - interested in any sightings or other information on asexual reproduction by asteroid larvae.

Janies, D. - would like to obtain frozen or ethanol preserved tissues of asteroids, especially of the order Velatida. Echinoderm embryos.

Kurihara, T. - interested in spatial distribution of starfishes, especially. Any information about this will be much appreciated.

Mouchaty, S. - interested in any information on the species distributions and on collections of mellitids. I request information on tissue collections (frozen or preserved in alcohol) available for research.

Munk, E.J. - Has the CCSNI completed its work? If so, how could I go about getting a copy of the AFS publication which gives common names of N.A. echinoderms?

Sastry, D.R.K. - would appreciate reprints of publications on biology and ecology of coral reef echinoderms.

Štorec, R. - detailed studies of microstructure, morphology and functions of skeletal elements in recent brittle-stars are needed for an evaluation of fossil disarticulated skeletons. I'd like to participate in such a study.

Stump, R.J.W. - still interested in post-doctoral study involving population dynamics, use of echinoderms as bioindicator species, and ecological modelling.

Tahera, Q. - would appreciate any publication on echinoderms related to taxonomy, systematics, reproduction, larval distribution and biodiversity (would like to be on reprint mailing list).

Viktorovskaya, G.I. - would be grateful to the specialists and institutions if they would send reprints of transactions of international conferences, and papers and books on invertebrates (sea urchins, crabs, crustaceans and molluscs).

Pacific Research Fishery Center (TINRO)  
4 Shevchenko Alley  
Vladivostok, 690600 Russia

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\*\*\*\*\* SUGGESTIONS \*\*\*\*\*

Zitt, J. - I am looking for taphonomic papers on crinoids and echinoids. Taphonomy of echinoderms should be summarized into a book during the next years. I can cooperate. Also, ontogeny of recent isocrinids should be studied in detail, mainly in regards to the stem variation. Detailed investigation of comatulid centrodorsal and associated structures from the point of view of the microstructure, anatomy and functions is necessary. Taphonomy of echinoderms in shallow sublittoral is poorly known.

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\*\*\*\*\* ANNOUNCEMENTS \*\*\*\*\*

David Lane has located significant numbers of the world's most massive sea star, *Thromidia catalai* at Manado. This I believe, is the first record of this species in the Indonesian Archipelago. Details will shortly be appearing in a forthcoming issue of the Raffles Bulletin of Zoology. zoolane@nus.sg

Carlos Cintra - We are forming an Echinoderms Collection that is going to be held in the "Museo de Historia Natural" de la Universidad Autonoma de Baja California Sur, La Paz, B.C.S., Mexico. In this one, we have some specimens collected in different points of the south region of the Gulf of California, a few from the north area, and some from the Revillagigedo Islands.

As was mentioned (CURRENT RESEARCH SECTION), the sea cucumber project is very important because it will enable us to know some basic aspects of the biology of the holothuroid. Also, we would like to make an evaluation of the actual fisheries of these organisms, for the purpose of bringing elements for an effective future management of the resource (if possible). Afterwards, the study will be applied in more populations of sea cucumbers in my country.

Dr. D.B. James, Senior Scientist, Tuticorin Research Centre, India, served as FAO Consultant for sea cucumbers in the Maldives from 12-12-95 to 22-12-95.

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contributed by J.M. Lawrence -

From the Annual Report of the Exeter City Museums and Art Gallery: "Professor David Nichols (Department of Biological Sciences, University of Exeter) very kindly donated much of his personal collection of books and papers relating to the echinoderms. This is the perfect complement to the existing Sladen Bequest library and updates our holding of literature of this fascinating phylum. The Sladen collection has continued to attract international research."

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\*\*\*\*\* AN OFFER \*\*\*\*\*

Campbell, D.B. - I have 25 copies of a reprint given to me by the author upon his retirement from the University of New Hampshire. I'll be happy to mail a reprint to whomever would like one.

Lavoie, M.E. 1956. How sea stars open bivalves. Biol. Bull. 111(1): 114-122.  
Mail reprint requests to: David B. Campbell,

Chair, Biology Dept.  
Rider University  
2083 Lawrenceville Rd.  
Lawrenceville, N.J. 08648

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\*\*\*\*\* UPCOMING CONFERENCE \*\*\*\*\*

Rodriguez, S.R. -

The Fourth International Temperate Reef Symposium will be held at the Catholic University of Chile, Santiago, 21-25th July 1997.

Details of symposia topics, registration and accommodation (including budget) to :

Coordinator 4th ITRS  
Departamento de Ecología  
Facultad de Ciencias Biológicas  
Universidad Católica de Chile  
Casilla 114-D Santiago, Chile

Phone: (56) 2- 686 2729  
Fax: (56) 2- 222-5515  
e-mail: reef@genes.bio.puc.cl

\*\*\*\*\* ITEMS OF INTEREST \*\*\*\*\*

An Addendum to Mortensen's Monograph of the Echinoidea

Hidden away at the end of the final volume (Vol. 5, 'Spatangoidea II') of Theodore Mortensen's *Monograph of the Echinoidea* (1928-51) are 10 pages of additional notes. It is in these final pages that he gives his key to the orders of the Class Echinoidea, on the grounds that, at the outset of his monumental exercise, "it was not at all clear to me what would be the natural classification of the whole class". He also summarises the zoogeographical distribution of the echinoids, plus a few extra remarks on the biology and folklore of the group.

But possibly the most fascinating part of this codicil is the opportunity he takes to let rip at some of his zoological colleagues. Mortensen was never one to miss the chance of a good curse if he thought a scientific misdemeanor had been committed, or merely if he wished to get back at somebody who had once had a go at him. So here in the last couple of pages or so is a series of vituperative attacks. First to receive admonition is J.P. Lambert (co-author with P. Thierry of *Essai de nomenclature raisonnée des Echinides*, 1924, for which work he says he is "deeply indebted"), who is pitched into thus:

"...the way in which particularly Lambert treats the nomenclature, arbitrarily adopting old, impossible names instead of names otherwise unanimously used in the whole echinological literature and thus changing the good old names and interchanging them...or using them in quite a new meaning...and then impertinently, as a dictator, changing the names also of the recent forms, about which he knows next to nothing, can only be characterised as a crime to science."

Then after positively fawning over Alexander Agassiz (*Revision of the Echini*, 1872-74) with these words:

"With immense learning and energy he cleared up the older literature on the recent Echini... This work will remain classical, the foundation of the study of the recent Echini; and most of the photographic illustrations are simply perfect, nothing like it ever having been published",

he launches into a bitter diatribe against him:

"However, there was much to criticise in the *Revision of the Echini*...but much worse I found his second great work, the report on the "Challenger" Echinoidea (1881)... Going into a critical study of the work I could not help finding it - I cannot help saying it - a bad piece of work, not at all worthy of the author".

Agassiz had had the temerity to criticise Mortensen's own habit of giving, not the magnification of his figures of pedicellariae, but the numbers of the objectives and eyepieces from which they were drawn. Mortensen's outrageous excuse for doing this is:

"To anybody accustomed to the study of pedicellariae and other minor structures, it does in general not matter very much to know the exact magnification by which such figures are drawn".

This seldom-read section is a marvellous example of fulminatory bile. Have others any examples of personal attacks from the echinoderm literature?

--- David Nichols, Exeter, UK

## A BRIEF HISTORY OF ASTEROID TAXONOMY

by Ailsa Clark

The oldest important treatise on sea-stars was Linck's monumental pre-linnaean work (1733) but this divided them into 'genera' by using arm number as a primary character. Linnaeus himself (1758 and thereabouts) had little time to spare for them and lumped the lot back into *Asterias*, some of his species depending on the illustrations of Linck and others. In 1815 Lamarck had a free field and described a number of genera and species, his names being mostly still valid today.

However, after this a period of flux set in, beset by coincidence of independent workers prone (I suspect) sometimes to patriotic bias and maybe poor linguistic facility. The first coincidence happened about 1840 when J.E. Gray at the British Museum and J. Müller and F.H. Troschel in Germany turned their attention to asteroids. Gray, as it proved, had a keen eye for a 'good' genus but gave only infuriatingly brief 'descriptions' of many of his new taxa. Müller & Troschel had a poorer concept of generic limits (for instance their *Astrogonium* included four of Gray's genera) but did give more detail. In 1842 they adopted some of Gray's names but his 1847 and 1866 papers reiterated his earlier classification. Perhaps this was due to pressure of work on his other duties as Keeper of Zoology or difficulty in reading German - a handicap I suffered myself, particularly when I started.

All these early descriptions of starfishes were limited to external characters. However, in the later nineteenth century, E. Perrier in Paris exploited the use of sodium hypochlorite (bleach) in cleaning off skin and also dismembered some of his specimens, thereby illuminating the three-dimensional relationships and variations of parts of the skeleton, besides studying the detailed forms of the pedicellariae. From this he drew up a classification of the higher groups. His revision of the asteroids of the Paris Museum in 1875 incorporated study of some of Gray's types in London as well as Lamarck's and other specimens in Paris. Unfortunately this work was marred by absence of illustrations. Sadly for British pride, Perrier's opposite number in London at the time was Jeffrey Bell, a casual and careless observer who often wildly misplaced his new nominal species, such as *Asterias longstaffi* - an astropectinid - and probably gave rise to a greater number of synonyms than almost any other taxonomist. His resentment of criticism and reluctance to submit his types to scrutiny led others such as the easily-roused Mortensen to resort to dealing through a third party to gain access to specimens in the British Museum.

Fortunately, Bell was passed over when it came to working up the vast collections made during the circumnavigation of the 'Challenger' and the job was given to Percy Sladen, a school teacher rather than a museum man. In 1889 Sladen's deeply researched 'Challenger' report included elaborate and well-illustrated descriptions of his many new species, among others, and most of his names are used today, though his use sometimes of Linck's inadmissible pre-linnaean names meant some needed changing. However, all his work was done without looking under the skin and superficial armament and his higher classification was based more on obvious differences like those shown by the marginal plates. Because of his monographic treatment of the class, other specialist neontologists, such as Fisher and H.L. Clark in the first half of the twentieth century, followed Sladen's classification, rather than that of Perrier, though Fisher's excellent studies extended to many internal characters. H.L. Clark worked also on the other classes of echinoderms, as did Koehler. Another stalwart of the same time was Döderlein who produced some massive monographs, mainly on asteroids, in the 'Siboga' reports (1917, 1920, 1921, 1924, 1935 and 1936), the early ones suffering from the isolation of Germany at the end of the first world war. Possibly here again, patriotic bias and difficulty in understanding Döderlein's very 'long-winded' prose daunted or

delayed some students from discovering the value of his taxonomic ideas.

It took the palaeontologists W.K. Spencer and C.W. Wright in the 'Treatise of Invertebrate Paleontology' (1966), to re-evaluate the classification, concluding that Perrier's higher classification was better than that of Sladen. This has been generally accepted and built on further in recent years, notably by Dan Blake. Meanwhile, some of us have been trying to settle problems at the generic and specific level.

Hopefully, thanks to all these and many others whose names cannot be mentioned for lack of space, the classification of asteroids (dare I say) has now achieved a fair degree of stability. Please don't rock the boat when I'm gone chums. It would be nice to think ones efforts had some lasting effect!

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## OBITUARY - DAVID DILWYN JOHN - FROM WHALING TO WALES VIA ECHINODERMS

(by Ailsa M. Clark)

Dilwyn John spent his early post-graduate years working with the Discovery Investigations - currently absorbed in the Institute of Oceanographic Sciences of the U.K. In the twenties and thirties this was primarily concerned with biological problems associated with whales and whaling and entailed his participation in long voyages to the Southern Ocean studying marine life. In 1927 and '28 he was Chief Scientist aboard the Royal Research Ship 'William Scoresby', working mainly in the Falkland-Magellan area, and from 1931 to '33 the R.R.S. 'Discovery 2' - successor to Scott's ship. The latter made the first winter circumnavigation of the Antarctic continent and worked many series of collecting stations between the pack-ice and the Falklands, also South Africa and Australasia, which must often have been very uncongenial, exposed to the daunting conditions in those parts but compensated by exciting discoveries of strange animals or observations new to science. At that time he specialized in the study of euphausians (krill) the prime food of most southern whalebone whales. However, when in the mid-1930's, he transferred to the Natural History Museum - then called the British Museum (Natural History) - it was to become curator of echinoderms, which had previously been dealt with by the curator of annelid worms. In this second career he was able to use his knowledge of antarctic biology in preparing several reports on the crinoids collected by the Discovery Investigations and other expeditions to the Southern Ocean, published between 1937 and 1939, which included new observations on life histories. After returning to South Kensington from war service, he turned to the asteroids and began a series of notes on historic specimens in the museum collections, particularly the type specimens, many of which dated back to around 1840 and had been named by J.E. Gray - a master of brevity to the puzzlement of later generations of students. Promotion to the deputy keepership of Zoology and then his elevation to be Director of the National Museum of Wales in 1948 cut short this revision, which devolved to me as his successor. Only two of his notes - both on astropectinids - were published. Later I read some of his correspondence with colleagues and laymen about echinoderms and was impressed not only with his willingness to give time to helping others wherever possible but also with his erudition and sense of humour. His elevation to high rank in the museum service was a considerable loss to marine science.

\*\*\*\*\* ECHINODERMS IN LITERATURE \*\*\*\*\*

Oe, K. 1974. The Silent Cry. "The young man had an enormous round head, the broad, helmetlike curve of his forehead giving the whole head the appearance of being a continuation of the face. The cheekbones projecting outward on each side and the blunt, square chin reminded one of nothing so much as a sea urchin in human guise. ... She was quite obviously suspicious of the Sea Urchin for having conferred with Takashi in a low voice, resolutely ignoring us. ... In a strong breeze that blew aimlessly about the valley beneath a blue sky, the young men were kicking the football around in silence and with suffocating intensity of purpose. The Sea Urchin in particular was dashing about desperately, a thick towel wound round the head that sat so incongruously large on his short trunk."

Kipling, R. 1912. Just So Stories. "In the sea, once upon a time, O my Best Beloved, there was a Whale, and he ate fishes. He ate the starfish, and the garfish, and the crab and the dab, and the plaice and the dace, and the skate and his mate, and the mackereel and the pickereel, and the really truly twirly-whirly eel." From: "How the Whale got his Throat"

Morgan, B. 1992. Random Passage. "Each morning the children searched the beach for driftwood, feathers, shells, smooth stones, star fish, and the bleached bones of small creatures washed up by the sea."

-- contributed by J.M. Lawrence

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**HOW I BEGAN TO STUDY ECHINODERMS ... Part 6.**

**Freeman, Steven M. - (The University of North Wales).**

"The Star Shaped Disc"

As an undergraduate I spent one year working as a Naturalist on the west coast of Florida. Not being a native to these parts my first experience wading the shallows off Key Island was not one I'll forget easily! It wasn't the feeling of fish brushing against my skin, a reaction I thought provoked by the novelty of my pale legs, it was the curious lump under my foot. A closer examination revealed, to my amazement, a finely patterned star on the under side of an animal shaped like a disc.

Following this informal introduction to the sand dollar I soon became fascinated with all aspects of echinoderm life. At the end of my stay in the United States I returned to England, with my new found passion, to finish my studies. Shortly after graduating, I secured a scholarship to do a PhD at the University of North Wales. Now I spend my days dedicated to continuing this fascination, but with other members of the Asteroid family.

**McClintock, James B.** (The University of Alabama at Birmingham). As an incoming freshman at the University of California at Santa Cruz in the mid 1970's, my interests leaned towards English Literature. However, soon thereafter an intense and provocative Introductory Biology course presented simultaneously by three professors turned the tide, and I knew I had found my niche in the field of Biology. In my Junior year I had a marvelous opportunity to enroll in a ten-week Marine Invertebrate Course at Bodega Marine Laboratory, on the rocky coastline of northern California. Although the group of organisms that the course focused on changed each year, I was fortunate enough to come along at the exact time that Echinoderms made their debut as a course topic! For the next ten weeks, my fellow students and I were immersed in lectures on Echinoderm Biology. Moreover, each of us conducted hands on research on some aspect of echinoderm physiology, behavior, ecology, etc. The course had such a profound effect on the students involved that it really does not surprise me to look back 20 years and see that a number of the students in this course have successful careers working with echinoderms (for example Scott Smiley and Tim Pennington to name a few). The course also brought me together for the first time with John Pearse, who was, and remains, a guiding force in my professional career and echinoderm studies.

John Pearse invited me to work in his laboratory during the senior year of my undergraduate career. I conducted a senior thesis on the growth of the echinoid *Strongylocentrotus purpuratus* in contrasting habitats of the rocky intertidal. My interests in echinoderms grew and following the advice of John Pearse, I applied to conduct my graduate studies in the laboratory of John Lawrence at the University of South Florida. Here, I found a dynamic environment where I was guided by a leader in the field of Echinoderm Biology and surrounded by fellow students engaged in studying diverse aspects of echinoderm biology, encompassing echinoderm phylogeny, physiology, and ecology. In 1983, John Lawrence invited me to work on aspects of echinoderm reproduction on the subantarctic island of Kerguelen. This experience laid the foundation for six subsequent trips to the Antarctic sponsored by the NSF to study echinoderm reproduction, nutrition, chemical ecology and population biology. My antarctic work included a Postdoctoral Fellowship with John Pearse, investigating aspects of larval and reproductive biology in echinoderms at McMurdo Sound.

Now an Associate Professor at the University of Alabama at Birmingham, my graduate students and I have continued with studies of echinoderms. My Advanced Invertebrate Zoology course focuses specifically on the Echinodermata, providing students a rare opportunity to spend an entire semester studying this group. It has been fun to share my enthusiasm for echinoderms with both undergraduate and graduate students. And it is through my students that I find myself rediscovering the unique nature of this fascinating group of animals.

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\*\*\*\*\* THESES AND DISSERTATIONS \*\*\*\*\*

AUSTRALIA

**Ph. D. Dissertation**

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BELGIUM

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CANADA

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NAKAMURA, R. 1995. A Current Affair: the role of hydrodynamics in the ecology and evolution of the Pacific sand dollar *Dendraster excentricus*. University of Toronto, Ontario.

FRANCE

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DEA

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## IRELAND

### B Sc Geology

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## JAMAICA

### M. Phil. Thesis

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## MEXICO

### Bachelor's Science Thesis

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## NEW ZEALAND

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### M Sc

SEETO, J. 1995. The reproductive biology of the sea cucumber *Holothuria atra* Jaeger, 1833 (Echinodermata: Holothuroidea) in Laucala Bay, Fiji, with notes on its population structure and symbiotic associations. University of Otago, N.Z.

## PAKISTAN

### Ph. D. Dissertation

TAHERA, Q. (in progress). Systematics, reproduction and larval distribution of holothuroids and echinoids inhabiting the Arabian Sea. University of Karachi.

## RUSSIA

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## SCOTLAND

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**Ph D Dissertation**

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**UNITED STATES**

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A.A. Balkema Publishers, Postbus 1675, NL-3000 BR Rotterdam, The Netherlands  
A.A. Balkema Publishers, Old Post Road, Brookfield, VT 05036-9704 (for Canada and U.S.)

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Flammang, P. Adhesion in echinoderms. pp. 1-60.

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A.A. Balkema, P.O. Box 1675, 3000 BR Rotterdam, The Netherlands. (Fax +31.10.4135947)

A.A. Balkema, Old Post Road, Brookfield, VT 05036, USA. (Fax 802.276.3837)

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IV. Releasing technique

| Selection of seeds

| Releasing season, size, location, density, and method

V. Management after releasing

| Biomass of algae

| Guarding against poaching

VI. Resource management

| Optimal fishing size

| Optimal exploitation rate

VII. Research techniques

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Wray, G.A. Molecular determinants of radial body organization in echinoderms. **Evolution of Development, Bodega Marine Lab, California, October, 1995.**

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(by conference)

Papers presented at the Florida Echinoderm Festival, 18 November 1995, Eckerd College, St. Petersburg, Florida. Organized by John Ferguson.

Bellew, Patrick : Morphological variation in the genus *Endoxocrinus*.

Featherstone, Chuck (Nova Southeastern Univ.): A seasonal analysis of proximate composition of *Chlorodocrinus decorus* and *Endoxocrinus parrae*.

Ferguson, John (Eckerd College): Madreporite structure and function.

Foret, Timothy (Univ. of South Florida): Echinoderm-bacteria symbioses.

Lares, Michael (Univ. South Florida): Effect of feeding frequency on feeding rate and digestion in sea urchins.

Lawrence, John (Univ. of South Florida): Capacity for production in the Chilean sea-urchin *Loxechinus albus*.

McEdward, Larry (Univ. of Florida): Facultative feeding in imaginary echinoderm larvae.

McGovern, Tammy (Florida State Univ.): Balance between sexual and asexual reproduction in echinoderms.

Messing, Charles (Nova Southeastern Univ.): A test of niche partitioning in *Chlorodocrinus decorus* and *Endoxocrinus parrae*.

Polson, Emma (Univ. South Florida): Role of proteins in crystal formation in *Mellita tenuis*.

Rankan, Dana (Nova Southeastern Univ.): Contribution of skeletal elements of *Chlorodocrinus decorus* to sediment.

Ruediger, Nicole (Univ. South Florida): Archenteron elongation in *Lytechinus variegatus*.

Sewell, Mary (Harbor Branch Oceanographic Institution): Reproduction in synaptid cucumbers.

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**Symposium: The Role of Cell-Cell Interactions and Environmental Stimuli in the Development of Marine Invertebrates.** American Society of Zoologists. 1993. Papers published in the American Zoologist, 35 (4), 1995.

Degnan, B.M., D.E. Morse. Developmental and morphogenetic gene regulation in *Haliothis rufescens* larvae at metamorphosis. 391-398.

Foltz, K.R. Gamete recognition and egg activation in sea urchins. 381-398.

Hardin, J. Target recognition by mesenchyme cells during sea urchin gastrulation. 358-372.

Hoegh-Guldberg, O., J.S. Pearse. Temperature, food availability, and the development of marine invertebrate larvae. 415-425.

Montgomery, M.K., M.J. McFall-Ngai. The inductive role of bacteria symbionts in the morphogenesis of a squid light organ. 372-380.

Shilling, F.M. Morphological and physiological responses of echinoderm larvae to nutritive signals. 399-414.

Shilling, F.M. Introduction to the Sympsoium: 351-352.

Strathmann, R.R. Peculiar constraints on life histories imposed by protective or nutritive devices for embryos. 426-433.

Wilt, F.H., B. Livingston, O. Khaner. 353-357.

**Annual Meeting of the American Society of Zoologists, 26-30 December, 1995, Washington, D.C.**  
Abstracts are in *American Zoologist*, 1995, vol. 35 (5). (communicated by J.M. Lawrence)

Beddingfield, S.D., J.B. McClintock. Temporal and spatial patterns of food resource utilization in the echinoid *Lytechinus variegatus* in contrasting habitats of Saint Joseph's Bay, Florida. 50A.

Clements, L.A.J., A. Lauricella, A. Strasbaugh. Effect of Cd and Zn on behavior and regeneration in the brittlestar *Ophiophragmus filograneus*. 112A.

Godin, R.E., A.L. Egana, D. Klinzing, S.G. Ernst. Analysis of the expression and potential function of several genes expressed during early sea urchin embryogenesis. 49A.

Herrera, J.C. Life history theory and intermediate energetic strategies. 12A. (echinoids)

Johnsen, S. Sensitivity to polarized light in an ophiuroid: its possible role as an indicator of ultraviolet light. 52A.

Klinger, T.S., J.M. Lawrence, A.L. Lawrence, K.L. Price, R. Boudreau, M. Koder. Somataic and gonadal growth of *Strongylocentrotus droebachiensis* (Echinodermata: Echinoidea) fed manufactured feeds. 109A.

Lares, M.T., J.M. Lawrence. The effects of feeding frequency on feeding and digestion of sea urchins (Echinodermata). 109A.

Lawrence, J.M., S. Olave, R. Otaiza, A.L. Lawrence & E. Bustos. A comparison of gonad production in *Loxechinus albus* (Echinodermata: Echinoidea) fed algae and prepared feeds. 109A.

LeClair, E.E. In vivo flexibility of ophiuroid arm joints: a multi-species survey of morphology, ecology, and behavior. 53A.

Levitian, D.R. Interspecific variation in fertilization success: the influence of gamete traits on sea urchin spawning success. 136A.

Miller, R.L. The specificity of sperm chemotaxis in some coral reef echinoderms. 54A.

Mooi, R. A framework for phylum phylogeny: skeletal homologies of echinoderms. 85A.

Pawson, D.L. Systematics and distribution of deep-sea megafauna, with emphasis on echinoderms. 85A.

Pearse, J.S., D. Beyer, M.E. Steele. Both photoperiod and diet influence resource partitioning between somatic and gonadal growth in sea urchins (*Strongylocentrotus franciscanus* and *S. purpuratus*). 109A.

Podolsky, R.D. Effects of the echinoid egg jelly coat on fertilization through changes in effective egg size. 54A.

Ryan, W.L., M.A. Kutztown. Impact of skeletal development on the relatively high susceptibility of *Lytechinus pictus* (sea urchin) larvae to gas bubble formation. 29A.

Swenson, D.P., J.B. McClintock. Chemoreceptive responses of *Coscinasterias tenuispina* (Echinodermata: Asteroidea) to odors of living prey, injured conspecifics, and krill extract. 112A.

Thorndyke, M.C., D.J. Potton. Neuroendocrine control of feeding in starfish. 47A.

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Harris, L. Studies on the effects of depth, water flow and diet on settlement, recruitment and growth of the green sea urchin *Strongylocentrotus droebachiensis* in the Gulf of Maine. 75-93.

Lawrence, J.M., & A. Bazhin. Strategies and life-history characteristics as criteria for evaluating the suitability of sea-urchin species for fisheries and aquaculture. 94-101.

Robinson, S., A. MacIntyre, & S. Bernier. The impact of scallop drags on sea urchin grounds. 102-121.

Robinson, S., H. Scarth, & A. MacIntyre. The green sea urchin fishery in southwestern New Brunswick. 18-33.

Steneck, R., D. McNaught, & S. Zimsen. Spatial and temporal patterns in sea urchin populations, herbivory and algal community structure in the Gulf of Maine: evidence for the impacts of harvesting. 34-73.

Vadas, R.L., B. Beal, S. Dudgeon, W. Wright. Spatial and temporal variability in reproduction and spawning in green sea urchins in Maine. 74. (abstract only)

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Abstracts in *Zoological Science*, 12 (supplement). 1995. communicated by J. Lawrence)

Arai, A., T. Nakazawa. Rearrangement of actin filaments and elongation of microvilli in sea urchin egg by TPA. p. 84

Asami, M., K. Yamazaki, I. Yasumasu. Gastrula stage specific mRNA found by mRNA differential display method in sea urchin embryo. p. 76

Birenheide, R., T. Motokawa. Cirri of the sea lily *Metacrinus rotundus*: their movements and their nervous system. p. 29

Fujimoto, H., I. Mabuchi. Cloning of cleavage-furrow-specific protein from sea-urchin eggs. p. 40

Hamaguchi, M.S. Relationship between intracellular pH and sperm aster formation in fertilized eggs of sea urchins. p. 63

Hattanda, M., K. Kuroishi, T. Murakami, M. Toriyama. Effects of 5 aK-protein on sea urchin sperm aster formation *in vitro*. p. 75

Ikegami, S., S. Ohta, H. Kobayashi, Y. Myotoishi, N. Yamafuku. Effects of Jaspisin, a selective inhibitor of matrix metalloproteinases on morphogenesis of echinoderm gastrulae. p. 85

Ishijima, S., M. Irie, H. Mohri, Y. Hamaguchi. Effects of Ca<sup>2+</sup> on the direction of rotational movement of demembranated sea urchin sperm axonemes after depletion of outer dynein arms. p. 119

Kamata, Y., A. Ide, A. Fujiwara, E. Tazawa, I. Yasumasu. Change in the sensitivities of sea urchin oocytes to melittin and mastoparanas during their maturation. p. 70

Kamimura, S., B. Trinczek. Inhibitory effects by synthesized peptide of tubulin C-terminal on the motility of triton-demembranated flagella of sea-urchin spermatozoa. p. 107

Katow, H., S. Komazaki. Expression and role of pamlin during early embryogenesis of sea urchin: primary mesenchyme cell migration, its termination and gastrulation. p. 75

Kawamoto, M., T. Saitou, I. Yasumasu. The protein phosphatase activities in sea urchin early embryos. p. 61

Kiyomoto, M., H. Izumi, J. Tsukahara, T. Miki-Noumura. The effect of blastocoelic fluid on the spicule formation of isolated interspecific micromere from sea urchin embryos. p. 61

Kohyama, K., E. Arakawa, S. Amemiya, N. Matsuoka. The taxonomic, genetic and evolutionary relationship between the two sea-urchins, *Asthenosoma ijimai* from Misaki and *Asthenosoma* sp. from Okinawa, in Japanese waters. p. 34

Komatsu, M., M. Sugiyama, T. Kobayashi, H. Tominaga. Development of an asteroid of the genus, *Astropecten*. p. 3

Komatsu, M., C. Oguro, J.M. Lawrence. Development of the seastar, *Echinaster spinulosus* Verrill. p. 33

Kominami, T., H. Takata. Dorso-ventral axis of sea urchin embryo is established during 32-64-cell stages. p. 84

Kuno, S., I. Yasumasu. Inhibition of the pseudopodial cable growth induced by insulin in the micromere-derived cells isolated from sea urchin embryos by Genistein and Worthmannin. p. 84

Kuraishi, R. Determination of the esophagus in starfish larvae. p. 62

Kuroiwa, Y., H. Shirai. The egg vegetal pole as the organizing center of starfish development (*Asterina pectinifera*). p. 73

Kyozuka, K., L. Santella. Resumption of meiosis in starfish oocytes requires an increase in nuclear calcium. p. 85

Makabe, K.W., E.H. Davidson. Cis-regulatory control of the SM50 gene on skeletogenic lineage specification. p. 61 (echinoid)

Minokawa, T., S. Amemiya. Skeletogenic potential of secondary mesenchyme cells in the embryoid derived from mesomeres combined with micromeres in echinoid embryos. p. 84

Minokawa, T., S. Amemiya, Y. Nakajima. Studies on reproductive ecology and gamete morphology of the crinoids. p. 83

Mita, M. Change in the levels of adenine-related compounds in ovarian follicle cells from *Asterina pectinifera* following treatment with GSS. p. 70

Mitsunaga-Nakatsubo, K., Y. Akimoto, K. Akasaka, T. Kitajima, H. Hirano, H. Shimada. Arylsulfatase protein is localized at cell surface of sea urchin embryos. p. 61

Miyawaki, K., H. Shirai. A step to elucidate the initial job of zygotic genome in starfish. p. 70

Miyazaki, A., Y. Uetake, S. Kitagawa, S. Washitani-Nemoto, S. Nemoto. Cyclic changes observed in starfish eggs artificially activated by a calcium ionophore. p. 84

Mizoguchi, H. Cell proliferation after hatching out of permanent blastula of sea urchin. p. 74

Morokuma, J., K. Akasaka, N. Sakamoto, H. Koike, K. Mitsunaga-Nakatsubo, H. Shimada. Factors that bind to the 5'-upstream cis-acting elements of sea urchin arylsulfatase gene.

Motokawa, T., R. Birenheide, T. Takahashi, M. Ohtani, Y. Muneoka. Bioactive peptides isolated from the sea cucumber *Stichopus japonicus*--II. Action on catch connective tissue. p. 105

Muneoka, Y., E. Iwakooshi, M. Ohtani, T. Takahashi, H. Teranishi, T. Ikeda, T. Fujita, H. Minakata, K. Nomoto. Bioactive peptides isolated from the sea cucumber *Stichopus japonicus*--I. Actions on muscle tissues. p. 105

Murayama, H., K. Maeda, H. Kuroda, R. Kuroda. Intraluminal calcium regulates calcium release via ryanodine receptor of sea urchin eggs. p. 69

Masui, M., T. Kominami. A cyto-embryological study of the gastrulation process in a sea urchin, *Scaphechinus mirabilis*. p. 85

Nakawa, N., M. Saneyoshi, M. Mita. Effects of synthetic a-(p-nitrobenzyl)adenine and related compounds on oocyte maturation of starfish *Asterina pectinifera*. p. 70

Nakagawa, T., Y. Kamata, I. Yasumasu. Mepacrine inhibits fertilization membrane formation in sea urchin eggs. p. 68

Nomura, K., N. Suzuki. Solubilization from the fertilization envelope, isolation and partial characterization of sea urchin ovoperoxidase. p. 79

Ogawa, M., K. Akasaka, K.N. Mitsunaga, H. Shimada. Cloning of maternal mRNA of sea urchin embryo by differential display. p. 60

Otake, T., M. Mita, I. Yasumasu. Change in phosphatidylcholine levels during prolonged incubation of sea urchin spermatozoa. p. 72

Oka, M.T., Y. Nakajima, M. Obika, T. Arai, Y. Nakayama, Y. Hamaguchi. The inhibition of sperm model motility by anti tubulin antibody binding on sperm axoneme. p. 119 (echinoid)

Onodera, H., M. Sakuma, M. Satoh, K. Yamasu, T. Suyemitsu. Molecular cloning of putative cytoplasmic protein tyrosine kinase in sea urchin embryos. p. 73

Ozeki, Y., T. Matsui, K. Titani. Echinoidin is a  $\text{Ca}^{2+}$ -dependent lectin with RGD-dependent cell adhesive activity. p. 42

Sakamoto, N., K. Akasaka, Y. Iuchi, K. Mitsunaga-Nakatsubo, H. Shimada. Tandem repeat OTX binding site required for the activation of transcription of the sea urchin arylsulfatase gene. p. 61

Satoh, S.K., H. Namikawa, M.S. Hamaguchi, Y. Hamaguchi. Caffeine induces restoration from inhibition

of cell division in treatment of sea urchin eggs with camptothecin. p. 71  
 Tachibana, K., K. Ooyama, T. Kishimoto. Calcineurin mediates the pathway from  $Ca^{2+}$  signal to DNA replication in fertilized echinoderm eggs. p. 68  
 Takagi Sawada, M., M. Ishikawa, K. Izumi, K. Yokoyama, H. Yokosawa, H. Sawada. Effects of new proteasome-specific inhibitors on starfish oocyte maturation. p. 69  
 Tazawa, E., A. Fujiwara, I. Yasumasu. Photo-activation of NADH-cytochrome C reductase in mitochondria of sea urchin, echiuroid, oyster and abalone. p. 48  
 Terakawa, A., R. Kuroda, H. Kuroda. Roles of cGMP and IP, in the  $Ca^{2+}$ -transient in sea urchin eggs. p. 69  
 Tobita, T., F. Hiraide, J. Miyazaki, T. Hirabayashi, T. Ishimoda-Takagi. Actin-binding properties of two tropomyosin isoforms involved in egg of the sea urchin, *Strongylocentrotus intermedius*. p. 47  
 Uetake, Y., S. Washitani-Nemoto, S. Nemoto. Behavior of microtubule structures in parthenogenetic starfish eggs: diversion of meiotic centrosomes into mitotic centrosomes. p. 83  
 Ushiyama, A., A. Shima, M. Hoshi. Radiation inactivation of the acrosome reaction-inducing substance (ARIS) of starfish, *Asterias amurensis*. p. 62  
 Washitani-Nemoto, S., S. Nemoto. Maturational stages of activation for inducing parthenogenesis in starfish eggs: activation at the immature (germinal vesicle) stage. p. 83  
 Yasazaki, K., C. Okamura, T. Maruyama, T. Ihara, I. Yasumasu. Are isoforms of  $Na^+/K^+$ -ATPase alpha-subunit of the sea urchin *H. pulcherrimus* encoded in the single gene. p. 42  
 Yazaki, I., E. Tosti, B. Dale. A gradiental distribution of L-type  $Ca^{2+}$  channels along the A-V axis of sea urchin embryos. p. 108  
 Yokota, Y., V. Matranga, F. Zito, V. Tesoiro, K.H. Kato, E. Nakano. On the mechanism generation the migration of sea urchin nectin to the surface area of eggs upon fertilization. p. 84  
 Yoshikawa, S. The spatial and temporal expression of Hpoe antigen during sea urchin embryogenesis. p. 61

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**9TH INTERNATIONAL ECHINODERM CONFERENCE, AUGUST 5-9, 1996, SAN FRANCISCO, CALIFORNIA, CALIFORNIA ACADEMY OF SCIENCES AND SAN FRANCISCO STATE UNIVERSITY (program and abstracts)**

Ali, M.S.M. Some Miocene Scutellina (Echinoidea, Echinodermata) from the northern part of the Western Desert, Egypt. p.23  
 Arakaki, Y., T. Uehara, I. Fagoonee. Comparison between *Echinometra* species from Mauritius and Okinawa. p.23  
 Aronson, R.B., D.B. Blake, T. Oji. Paleozoic-type echinoderm populations from the Late Eocene, Antarctica. p.24  
 Ausich, W.I. Origin of the class Crinoidea. p.24  
 Balch, T., R.E. Scheibling. Settlement and recruitment of echinoderms in kelp beds and sea urchin-dominated barren grounds in Nova Scotia. p.25  
 Balch, T., R.E. Scheibling, L.G. Harris, C.M. Chester, S.M.C. Robinson. Variation in settlement of the green sea urchin (*Strongylocentrotus droebachiensis*) in the northwest Atlantic: effects of spatial scale and sampling method. poster p.25  
 Balser, E., E. Fisher. The effect of salinity on heartbeat frequency in larvae of the asteroid *Pisaster ochraceus*. p.26  
 Barker, M.F., N. Goebel. The use of artificial diets supplemented with carotenoid pigments as feeds for sea urchins. p.26  
 Basch, L.V., M.J. Tegner. Reproductive ecology of sea urchins, *Strongylocentrotus purpuratus*, at

contrasting intertidal and subtidal environments. p.27

Baumiller, T.K., L. Rome. Nearest-neighbor analysis of individuals of *Neocrinus decorus*: implications to crinoid ecology. p.27

Bazhin, A.G. A list of species and geographical distribution of the genus *Strongylocentrotus* (Echinodermata: Echinoidea) in the seas of Russia. p.28

Beardsley, A.M., J.M. Colacino. System-wide oxygen transport by the water vascular system of the burrowing ophiuroid, *Hemipholis elongata* Say. p.28

Beer, A.-J., M.C. Thorndyke. Studies on the developing nervous system of the sea urchin *Psammechinus miliaris*. p.29

Bentley, A.C. Reproductive cycle and gonadal histology of the sand dollar *Echinodiscus bisperforatus* (Echinodermata: Echinoidea) in South Africa. p.29

Beyer, D., J.S. Pearse, M.E. Steele. Both photoperiod and diet influence resource partitioning between somatic and gonad growth in sea urchins, *Strongylocentrotus franciscanus*. p.30

Biermann, C.H. Population genetic structure and the evolution of reproductive isolation in strongylocentrotid sea urchins. p.30

Birenheide, R., T. Motokawa. A new biological motor-contractile ligament in crinoids. p.31

Blake, D.B. Hypotheses on morphology and phylogeny of Paleozoic stelleroids. p.31

Boettger, S.A., T.S. Klinger. Responses of *Arbacia punctulata* (Echinodermata: Echinoidea) to stress induced by elevated phosphate levels. poster p.31

Bonasoro, F., M.D. Candia-Carnevali, C. Moss, M.C. Thorndyke. Epimorphic versus morphallactic mechanisms in arm regeneration of crinoids and asteroids: pattern of cell proliferation/ differentiation and cell lineage. poster p.32

Borzone, C.A., Y.A.G. Tavares, F.C. Barros Jr. Beach morphodynamics and distribution of *Mellita quinquesperforata* (Leske, 1778) on sandy beaches of southern Brazil. poster p.32

Borzone, C.A., Y.A.G. Tavares. Morphometric variations of *Mellita quinquesperforata* (Leske, 1778) in different sandy beach environments. poster p.33

Borzone, C.A., Y.A.G. Tavares. General features of population dynamics of the sand dollar *Mellita quinquesperforata* (Leske, 1778) in southern Brazilian sandy beaches. poster p.33

Bradbury, A., W.A. Palsson, R.E. Pacunski. Stock assessment of the commercial sea cucumber *Parastichopus californicus* in the San Juan Islands, Washington state, USA. p.34

Brey, T. Predicting echinoderm P/B ratios by artificial neural networks. p.127

Burch, B.L., T.A. Burch. Comparison of variation in specimen size in aggregations of *Chaetodiadema pallidum* Agassiz & Clark, 1906 in the Hawaiian Archipelago. p.34

Burnett, W.J., J.D. McKenzie, M.S. Kelly. Co-evolution of ophiuroids and their bacterial symbionts: studies using 16S rRNA. p.34

Byrne, M. Modification of larval form and life history evolution in the asteroid genus *Patiriella*. p.35

Byrne, M. Ultrastructure of autotomy and catch connective tissue regions of the integument of *Eupentacta quinquesemita* (Holothuroidea). poster p.35

Byrne, M., A. Cerra, T. Nishigaki, M. Hoshi. Male infertility: a new phenomenon affecting Japanese populations of the sea star *Asterias amurensis*. poster p.36

Byrne, M., M.G. Morrice, B. Wolf. Introduction of the northern Pacific asteroid *Asterias amurensis* to Tasmania: reproduction and current distribution. poster p.36

Byrne, M., R.K. Siegel. Comparison of vitellogenic mechanisms in the oligolecithal eggs of *Heliocidaris tuberculata* and the macro-lecithal eggs of *H. erythrogramma* (Echinoidea). poster p.37

Byrne, M., V.B. Morris, M. Frommer. Homeobox gene sequences identified in the sea urchin *Holopneustes purpurescens* Agassiz (Echinoidea: Euechinoidea: Temnopleuridae). poster p.37

Byrne, M., E.M. Moylan, E.M. Sides. The fishery and cultivation of *Paracentrotus lividus* in Ireland. poster p.38

Byrne, M., P. Selvakumaraswamy. A Vitellaria with a reduced ophiopluteal skeleton. poster p.38

Campbell, A.C., B.L. Savill. Regeneration of pedicellariae in *Psammechinus miliaris* (Gmelin). p.38

Campbell, A.C., J.-L. Solandt. Habitat selection in Jamaican echinoids. p. 39

Candia-Carnevali, M.D., F. Bonasoro, U. Welsch, M.C. Thorndyke. Arm regeneration and growth factors in crinoids. p.39

Castro, L.R.S. Review of recent developments in the Baja California, Mexico *Isostichopus fuscus*, *Holothuria impatiens*, and *Parastichopus parvimensis* fisheries. p.40

Catoira, J.L., M.F. Montero-Torreiro, P. Garcia-Martinez, G. Mosquera. Seasonal variation for biochemical composition on the gonads of the sea urchin, *Paracentrotus lividus* L. poster p.40

Cavey, M.J. Neuromyoepithelial relationships in the starfish ambulacrum and excitation-contraction coupling among the podial retractor cells. p.41

Cavey, M.J. A simple device for rapid decalcification of the starfish ambulacrum with ascorbic acid (vitamin C). poster p.41

Cerra, A., M. Byrne. Cell surface features and the extracellular matrix around the larvae of *Patiriella* species with planktonic, benthic and intragonadal development: implications for larval nutrition. poster p.42

Chen, C.-P., C.-M. Chao. Reduction of growth rate as the major process in the miniaturization of the sand dollar, *Sinacchinocymus mai*. p.42

Clements, L.A.J., A. Lauricella, A. Strasbaugh, E.K. Serff. The effects of cadmium and zinc on growth, regeneration and behavior in the burrowing brittlestar *Ophiophragmus filograneus*. p.43

Conand, C. Overexploitation in the present world sea cucumber fisheries and perspectives in mariculture. p.43

Conand, C., M. Heeb, M. Peyrot-Clausade. Evaluations of bioerosion by two types of the sea urchin *Echinometra mathaei*, on several sites of a fringing reef in La Réunion Island (Indian Ocean) and comparison with other sites. p.43

Crump, R.G., R.H. Emson. Observations on the effects of the "Sea Empress" oil spill on tide pool echinoderms in Milford Haven, South Wales. p.44

Dahm, C. Population ecology of brittle stars inhabiting the Weddell Sea shelf (Antarctica). p.127

Dale, J.H. Coordination of chemosensory orientation in the starfish *Asterias forbesi*. poster p.44

David, B., R. Mooi. Major events in the evolution of echinoderms viewed by the light of embryology. p.45

David, B., F. Magniez, P. de Wever. *In situ* observation of the deep sea poutaleiid *Cystocrepis setigera* in the Peru Trench. poster p.45

David, B., Lefebvre, B., P. Racheboeuf. Homologies in stylophoran echinoderms. poster p.46

Davoult, D., F. Dewailly, A. Migné. Carbon and nitrogen budget of a dense population of the suspension-feeding ophiuroid *Ophiothrix fragilis* in a coastal ecosystem. p.46

Dean, J. *Stenaster obtusus*: asteroid or ophiuroid? poster p.46

De Bremaeker, N., J. Mallefet, F. Baguet, M.C. Thorndyke, D.J. Potton. Presence of the neuropeptides salmamides S1 and S2 in the brittlestar: *Amphipholis squamata*: immunohistochemical and radioimmunoassay detections. p.47

Deheyn, D., J. Mallefet, M. Jangoux. Bioluminescence in *Amphipholis squamata*: an anti-predator aposematic deterrent function? p.47

Deheyn, D., I. Eeckhaut, J. Moens, E. Schockaert, M. Jangoux. *Discoplana* n.sp. (Polycladida), a turbellarian parasite of the ophiuroid *Ophiothrix vigelandi*. poster p.48

Deheyn, D., G. De Becker, L. Oberdan, J. Mallefet, M. Jangoux. Production of monoclonal antibodies raised against *Amphipholis squamata* photocytes. poster p.48

Demian, D.J., C.W. Walker. Interrelated mitogenic signalling pathways during spermatogonial G1/S-phase traverse in the testis of the north Atlantic sea star *Asterias vulgaris*. p.49

Demian, D.J., C.W. Walker, M.P. Lesser. Prepared food coupled with manipulation of photoperiod yield an out-of-season crop for the northeastern sea urchin. poster p.49

Ebert, T.A. An examination of assumptions used in the development of management programs for echinoderm fisheries. p.50

Eble, G.J. Diversification of Disasteroids, Holasteroids and Spatangooids in the Mesozoic. p.50

EEckhaut, I., D. Deheyn, M. Jangoux. Study on the symbiotic fauna of crinoids collected in Hansa Bay (Bismarck Sea, Papua New-Guinea). p.51

EEckhaut, I., D. Van den Spiegel, A. Michel, M. Jangoux. Chemical detection and host recognition by the crab *Harrovia longipes* Lanchester, 1900, an ectosymbiont of crinoids. poster p.51

Ellers, O., M. Telford. A comparison of mechanical properties of vertebrate and echinoderm collagenous tissues. p.52

Emlet, R.B., O. Hoegh-Guldberg. Energy use during development of a lecithotrophic and a planktotrophic echinoid. p.52

Emlet, R.B., B.M. Miller. Temperature-dependent developmental rates and age determination of newly settled red and purple sea urchins. poster p.53

Emson, R.H., P.G. Moore. The effects of dietary differences on gonad size in three natural closely adjacent populations of *Echinus esculentus*. poster p.53

Emson, R.H., K.T. Tanti. Pedicellarial regeneration pattern in *Psammechinus miliaris*; random or predictable? poster p.53

Escribano Ródenas, M., D. Gil Cid, P. Domínguez Alonso. The "Cystoid Beds" from Navas de Estena (Middle Ordovician, Montes de Toledo, Spain). p.54

Evdomikov, V.V., G.I. Victorovskaya, I.V. Biryukova. A possibility of artificial recovery of sea urchin concentrations in natural communities. p.127

Featherstone, C.M., C.G. Messing, J.B. McClintock. Seasonal variation in the biochemical and energetic composition of two bathyal stalked crinoids: *Neocrinus decorus* and *Endoxocrinus parrae*. p.54

Featherstone, C.M., C.G. Messing, J.B. McClintock. The diets of two bathyal stalked crinoids: *Neocrinus decorus* and *Endoxocrinus parrae*. poster p.55

Féral, J.-P., É. Poulin, É. Derelle, K. Oubelkheir. Geographic and genetic differentiation of *Echinocardium cordatum*. p.55

Fernandez, C., C.F. Boudouresque. The effect of quality of artificial diet on feeding in the sea urchin *Paracentrotus lividus* (Echinodermata: Echinoidea). p.56

Foltz, D.W. Distribution of intertidal *Leptasterias* spp. along the Pacific North American coast: a synthesis of allozymic and mtDNA data. p.56

Fujisawa, H. Correlation between thermosensitivity of sea urchin embryos and membrane fluidity of the embryonic cells. poster p.57

Fujita, D. Strongylocentrotid sea urchin-dominated barren grounds on the Sea-of-Japan coast of northern Japan. p.57

Fujita, T. Brooding of the deep-sea brittlestar *Amphiophiura penichra* (H.L. Clark). p.57

Gabaev, D.D. Some aspects of the ecology of young echinoderms settling on artificial substrata. p.58

Gage, J.D., P.A. Lamont. Dense brittle star population on the Scottish continental slope. p.58

Gallemí, J., M.P. Villalba. A marsupiate cidaroid from the Late Cretaceous of south eastern Pyrenees. p.59

García-Arrarás, J.E., I. Torres, L. Estrada. Cellular events during intestinal regeneration in *Holothuria glaberrima*: analysis using monoclonal antibodies. poster p.59

Gavrilova, G.S. Regularities of distribution and present state of commercial echinoderm stocks in Peter the Great Bay (Japan Sea). p.128

Gavrilova, G.S. Some population characteristics of commercial species of echinoderms in Peter the Great Bay (The Sea of Japan). p.128

Gebruk, A.V. Spicule changes during somatic growth in holothurians. p.128

George, S.B., C. Young. Can bathyal echinoids maintain the production of high quality eggs regardless of diet? p.60

Gil Cid, D., P. Domínguez-Alonso, M. Escribano Ródenas. Biomechanical behaviour and anatomical features of *cincta* (Carpoidea). poster p.60

Gil Cid, D., P. Domínguez Alonso, M. Escribano Ródenas. Carpoidea and Echinodermata from the Middle Cambrian from Zafra (SW Spain). p.61

Gil Cid, D., P. Domínguez Alonso, M. Escribano Ródenas. The Echinoderm and Chordate fauna of the "Pizarras Cantera" Formation (Upper Ordovician, southern Spain). poster p.61

Grosjean, P., C. Spirlet, M. Jangoux. Closed-circuit cultivation of the edible sea-urchin *Paracentrotus lividus*: optimization of somatic growth through the control of abiotic environment. p.62

Gudimova, E.M., V.S. Levin. Taxonomic relationship between *Cucumaria frondosa* and *C. japonica* (Dendrochirotida, Cucumariidae). p.130

Guerrazzi, M.C., E.H. Morgado, L.F.L. Duarte. Population structure of the starfish *Echinaster brasiliensis* Müller & Troschel along the southeastern Brazilian coast. poster p.62

Guerrazzi, M.C., E.H. Morgado, L.F.L. Duarte. Foraging activity in population of the starfish *Echinaster brasiliensis* Müller & Troschel. poster p.63

Hadel, V.F., C.G. Tiago, A.S.F. Ditadi, G.Y. Kawauchi. Reproduction and development of the apodous holothurian *Chiridota rotifera* (Pourtales, 1851), in the laboratory. poster p.63

Hagdorn, H., T.K. Baumiller. The distribution and morphology of *Holocrinus*, the earliest post Paleozoic crinoid. p.64

Hagen, N.T. Effects of food availability and body size on out-of-season gonad yield in the green sea urchin. p.64

Harris, L.G. Changing ecological patterns for two *Asterias* species in the southwestern Gulf of Maine, over a 20 year period beginning in 1975. p.64-65

Hart, M.W., M. Byrne, M.J. Smith. The molecular phylogeny of *Patiriella* species and analysis of life history evolution in asterinid starfish. p.66

Haude, R. Evolutionary reconstruction of primitive (spinate) pedicellariae. p.66

Heinzeller, T. Crinoid classification according to nervous structures. p.67

Heinzeller, T., N. Améziane-Cominardi. Development of cyrtocrinids (Echinodermata: Crinoidea). poster p.67

Hendler, G. Evidence of a full suite of feet in *Ophiomusium* and allies. p.67-68

Hill, S., C.M. Pomory, T.W. Foret, J.M. Lawrence. Characteristics of a population of *Holothuria floridana* (Echinodermata: Holothuroidea) in the Florida Keys. poster p.69

Hood, S., R. Mooi. Phylogenetics and taxonomy of *Brisaster*, a genus of deep water schizasterid spatangoids. poster p.69

Hopkins, T.S. A sea star conundrum: The genus *Henricia* (Echinasteridae) from the U.S. Pacific coast. Part. I. The San Diego connection. p.70

Hotchkiss, F.H.C. Discussion of pentamerism: The five-part pattern of *Stromatocystites*, Asterozoa, and Echinozoa. poster p.70

Irimura, S. Forms of the disk granules of Ophiuroidea and their taxonomic significance. p.70

Ishida, Y., T. Tanabe, T. Ito, K. Hachiya. Fossil ophiuroids from the Hijikata Formation Kakegawa Group (Plio-Pleistocene), Shizuoka Prefecture, Central Japan. p.71

Ito, Y., I. Hayashi. Basic behavior of 3 species of sea urchins under experimental conditions. p.71

Jaeckle, W. Variation in alanine transport among sibling lecithotrophic larvae of holothuroid and asteroid echinoderms. p.72

Jagt, J.W.M., M. Kutschera. Campanian-Maastrichtian ophiuroids (Echinodermata) from Germany and the Netherlands: an update. p.72

Jagt, J.W.M., R.W.J.M. Van Der Ham. Late Cretaceous Hemiasterid echinoids from the type area of the Maastrichtian stage. poster p.73

Jagt, J.W.M., L. Indeherberge, E. Defour, R.W.J.M. Van Der Ham. The use of silicone rubber casts in species identification: the Late Cretaceous echinoid genus *Diplodetus* Schlüter, 1900. poster p.73

Janies, D.A. Reconstructing the evolution of asteroid morphogenesis and dispersal. p.74

Jeffery, C.H. Carrying on regardless: changes in the echinoid genus *Cyclaster* at the Cretaceous-Tertiary boundary. poster p. 74

Jeffery, C.H. Echinoids from the Maastrichtian and Danian of the Mangyshlak Peninsula, Kazakhstan. poster p.74

Johnson, A.S., O. Ellers. Is skeletal growth in sea urchins analogous to molting? p.75

Kaasa, O., K. Gunnarsson, E. Hjorleifsson. Population dynamics of the green sea urchin *Strongylocentrotus droebachiensis* in Eyjafjördur, North Iceland: A comparison of kelp front and barren ground urchins. p.75

Kashenko, S.D. Effect of acclimation to desalination of the sea cucumber *Stichopus japonicus* (Echinodermata: Holothuroidea) during the prespawning period on adaptability of different development stages. p.129

Kashenko, S.D. Effect of temperature and salinity on the development of holothurians. p.129

Keesing, J., S. Uthicke, P. McShane, N. Andrew, W. Zacharin, H. Gorfine, M. Alma, D. Ramm, L. Joll. A review of the status of echinoderm fisheries in Australia and New Zealand. p.76

Kelly, M.S., J.D. McKenzie. Sea urchins in polyculture: the way to enhanced gonad growth? p.76

Kendrick, D.C. Phylogenetic analysis and convergence in flexible crinoids. p.77

Klinger, T.S., J.M. Lawrence, A.L. Lawrence. Absorption and assimilation of prepared feeds by echinoids. p.77

Klinger, T.S., C.R. Johnson. Spatial and temporal distribution of feeding of Aspidochirotida (Holothuroidea) on Heron Island, Great Barrier Reef. poster p.78

Knott, K.E. A comparative study of the morphological and biochemical variation in two forms of *Luidia clathrata* from the northern Gulf of Mexico. p.78

Kogure, Y., I. Hayashi. Distribution of echinoderms in the Sado Strait, the Japan Sea. p.79

Komatsu, M., K. Terashima, J. Prestege, C. Oguro. Larvae are present in the ovoviparous sea star, *Patiriella vivipara*. p.79

Lamare, M. Restricted larval transport in a population of the sea urchin, *Evechinus chloroticus* (Val.) in a New Zealand fiord. p.80

Lambert, P. A taxonomic revision of some west coast cucumariid brooders. p.80

Lane, D.W.J., B. Koh. Locomotory coordination and the podia-ampulla system in *Stellaster equestris* (Asteroidea; Goniasteridae). poster p.80

Larson, R.C., D.A. Woodby. Response of sea cucumber populations to a conservative harvest strategy in southeast Alaska, USA. p.81

Lawrence, J.M., C.M. Pomory, J. Sonnenholzner, C.-M. Chao. Analysis of bilateral symmetry in Clypeasteroida (Echinodermata). p.81

Lawrence, J.M., A. Bazhin, B.R. Robbins. Phenotypic plasticity in *Strongylocentrotus droebachiensis* (Echinodermata: Echinoidea) at Petropavlovsk-Kamchatsky, Russia. poster p.81

Leddy, H.A. Walking versus breathing: functional morphology of oral and aboral podia from the green sea urchin, *Strongylocentrotus droebachiensis*. p.82

Lepper, D.M.E. Ultrastructure and morphology of the epidermis and tube feet of two echinoderms. p.82

Lepper, D.M.E., P.A. Moore. The role of chemical signals in the foraging behavior of the sea star *Asterias forbesi*. poster p.83

Lessios, H.A., B.D. Kessing, G.M. Wellington, A. Graybeal. Indo-Pacific echinoids in the tropical Eastern Pacific. p.83

Liesman, J.M. Variable recruitment of the estuarine brittlestar *Ophiophragmus filograneus* (Echinodermata: Ophiuroidea) in the Banana River, Florida. p.84

Littlewood, D.T.J., K.A. Clough, R.H. Emson, A.B. Smith. Five classes of echinoderm and one school of thought. p.84

Lockhart, S.J. Prey selectivity and feeding rates of the introduced sea star, *Asterias amurensis* (Lutken), in

Tasmania, Australia. p.84

Lockhart, S.J. Description of a new species of the echinoid genus *Ctenocidaris*, from Prydz Bay, Antarctica. poster p.84

Lowe, C.J., G.A. Wray. Engrailed expression during juvenile development in the ophiuroid *Amphipholis squamata*. p.85

Mah, C. Phylogeny and taxonomy of the Brisingida (Asteroidea: Forcipulatacea) with natural history notes from Monterey Bay. poster p.85

Makra, A., B.F. Keegan. Microdistribution within a population of *Acrocnida brachiata* (Montagu), (Echinodermata: Ophiuroidea) on the west coast of Ireland. poster p.86

Mallefet, J., B. Chabot, F. Baguet. Characterization of calcium requirement for *Amphipholis squamata* (Ophiuroidea) luminescence. poster p.86

Mannfield, K., G.D. Sevastopulo. Long stemmed crinoids from the Carboniferous of Ireland. p.87

Marsh, A.G., D.T. Manahan. Embryonic development in the Antarctic sea urchin *Sterechinus neumayeri*: physiological differences between pelagic and demersal development. p.87

Marsh, L.M. Hitch-hiking ophiuroids. poster p.87

Martinez, P.C., M.V. Toral, R.H. Bustamante. Population and reproductive biology of the sea cucumber *Isostichopus fuscus* in the Galapagos Islands. p.88

Martinez, P.C., R.H. Richmond. Effect of diet on growth and larval development of the sea cucumber *Holothuria nobilis* in Guam. poster p.88

Maubon, R.M. Inventory of the collections of the Muséum d'Histoire Naturelle, Grenoble and inventory of the Thiéry collection, Nancy. poster p.88

McClintock, J.B., G.A. Hines, C.B. Byrum, K.M. Wasson, S.A. Watts. Sex steroid biosynthesis in two Antarctic echinoderms: *Odontaster validus* and *Sterechinus neumayeri*. p.89

McClintock, J.B., K.R. Marion, S.A. Watts, G. Schinner, T.S. Hopkins. Seasonal gonad maturation in the seastar *Astropecten articulatus* from the northern Gulf of Mexico. poster p.89

McCormack, G.P., B.F. Keegan, R. Powell. The use of RAPD (random amplified polymorphic DNA) analysis in genetic studies of brittle stars (Echinodermata: Ophiuroidea). p.90

McKenzie, J.D., L.C. Newton. Development and evaluation of echinoderm pollution assays. p.90

McNamara, K.J. First records of Holasteroid, Neolampadoid and Aeropsid echinoids from Australian waters. p.130

Medeiros-Bergen, D.E., N.T. Perna, J.A. Conroy, T.D. Kocher. Molecular identification of ophiuroid post-larvae in the western Gulf of Maine. poster p.90

Meidel, S., R.E. Scheibling. The effect of diet on first reproduction and larval development in the green sea urchin *Strongylocentrotus droebachiensis*. p.91

Meidel, S., R.E. Scheibling. Resource allocation in juvenile and adult sea urchins (*Strongylocentrotus droebachiensis*) in kelp beds and barren grounds off Nova Scotia. poster p.91

Messing, C.G. An initial re-assessment of the distribution and diversity of the East Indian shallow-water crinoid fauna. p.92

Metaxas, A., C.M. Young. The effect of a dense food patch on larval response to haloclines. p.92

Mito, T. A PCR survey of HOM/HOX-class homeobox genes in the sea star, *Asterina minor*. poster p.93

Mladenov, P.V., P. Gerring. Resource evaluation of the sea cucumber (*Stichopus mollis*) in an environmentally sensitive region of New Zealand. p.93

Moosleitner, H. Is "*Fromia nodosa*" from the Maldives another species? p.93

Motokawa, S.T. "Exoskeleton-like endoskeleton" + "mechanically active connective tissue" = success of echinoderms. p.94

Nebelsick, J.H. Palaeoecology and taphonomy of the Miocene sand dollar *Parascutella*. p.94

Neill, J.B., D. King, S. Kuhn. Systematic relationships in the genus *Echinometra* as inferred from morphometric analyses. p.95

Nichols, D., P.V. Mladenov. Seasonality of cell-inclusions during gametogenesis in the comatulid

*Oxycomanthus plectrophorum* from New Zealand. poster p.95

Nilsson, H.C. Effects of hypoxia and organic enrichment on growth of the brittle stars *Amphiura filiformis* and *Amphiura chiajei*. p.96

Oganesyan, S.A. Reproductive cycle of green sea urchin *Strongylocentrotus droebachiensis* in the Barents Sea coastal areas. poster p.96

Oganesyan, S.A., G.V. Grigorjev. Morphology and seasonal changes of gonads in *Cucumaria frondosa* (Holothuroidea, Echinodermata) in the Barents Sea. poster p.97

Ojeda, F.P., C.W. Caceres, S.J. Gonzalez. Experimental feeding ecology of the edible sea urchin, *Loxechinus albus*, off the coast of northern Chile. p.97

Oji, T. A comparison of predation pressure between shallow- and deep-water populations of *Endoxocrinus parrae*, a west Atlantic stalked crinoid. p.98

Oji, T., M. Tamura. The oldest record of articulate crinoids: Smithian *Holocrinus*? from northeast Japan. poster p.98

O'Loughlin, P.M. A review of the holothurian family Gephyrothuriidae. poster p.99

O'Loughlin, P.M. Elasipod holothurians from the continental slope of Australia. poster p.99

Oyen, C.W. Patterns of allometric heterochrony in Cenozoic Mellitid echinoids from the southeastern USA, and the relationship of paleoecology to the evolutionary trends. p.100

Parsley, R.L. Taxonomic revision of the Stylophora. p.100

Pearse, V.B., J.S. Pearse, M. Byrne, G. Hendler. Discovery of an accessible population of *Ophiocanops*, off NE Sulawesi, Indonesia. poster p.101

Pearse, J.S. Distribution of *Diadema savignyi* and *Diadema setosum* in the tropical Pacific. poster p.101

Perez-Acevedo, N.L., J. de la Cruz, J. del Castillo, D.S. Smith. Transient wrinkles in a variable length tendon. p.102

Pérez-Plascencia, G. Growth and reproduction of the commercial sea cucumber *Parastichopus parvimensis* in Baja California, Mexico. p.102

Piepenburg, D. Brittle star assemblages on Arctic shelves: distribution, composition and significance in benthic systems. p.103

Popodi, E., M.J. Ferkowicz, M.E. Andrews, R.A. Raff. Expression of engrailed and *wnt5* in the developing sea urchin nervous system. p.103

Popodi, E., J.A. Bolker, M.J. Ferkowicz, M.E. Andrews, R.A. Raff. Development of the sea urchin central nervous system in *Helicidaris erythrogramma*. poster p.104

Potton, D.J., M.C. Thorndyke. Neurohormonal peptide regulation of stomach motility in starfish: *in vivo* and *in vitro* studies. p.104

Poulin, É., J.-P. Féral. Consequences of brood protection on the genetic structure of the sea urchin *Abatus cordatus*, endemic to Kerguelen, and the origin of the diversity of Antarctic echinoids. p. 105

Powell II, C.L., R. Mooi. Echinodermata of the Miocene and Pliocene Imperial Formation of southern California. poster p.105

Propp, M.V., A.A. Karpenko, V.K. Iljaschenko. Recording movements and activity of sand dollars and common heart urchins in the sediment by measuring high frequency conductivity and magnetic fields. p.106

Robinson, S.M.C., L. Colborne. Roe enhancement trials of the green sea urchin using an artificial food source. p.106

Rodriguez, E., S. Marques Pauls. Sea cucumber fisheries in Venezuela. poster p.107

Rodriguez, S.R., J.M. Farina, F.P. Ojeda. Behavior and spatial distribution patterns of the sea urchin *Tetrapygus niger* (Echinodermata: Echinoidea) in presence of predators, food, and topography. p.107

Rogers-Bennett, L. Recovery of red sea urchin beds following spatial and size based experimental fishing. p.108

Rose, E.P.F., A.C. Watson. Burrowing adaptations of schizasterid echinoids from the globigerina limestone (Miocene) of Malta and their evolutionary significance. p.108

Rowland, C.J. *Marginaster littoralis* Dartnall, 1970 (Echinodermata, Asteroidea): a case of genetic swamping by an introduced pest? p.131

Rozhnov, S.V. The left-right asymmetry in echinoderms. p.109

Russell, M.P., T.A. Ebert, P.S. Petraitis. Field estimates of growth and mortality for the green sea urchin, *Strongylocentrotus droebachiensis*. p.109

Ryabushko, V.I. Levels of energy metabolism of echinoderms in the evolution of the animal kingdom. p.131

Scheibling, R.E., A.W. Hennigar. Large-scale oceanographic and meteorologic features and recurrent mass mortalities of sea urchins off Nova Scotia. p.110

Sewell, M.A., C.M. Young. Echinoderm egg size-distributions are not always bimodal. p.110

Shkuratov, D.Y., S.D. Kashenko, A.L. Drozdov. Influence of low intensity laser radiation and super-high-frequency electromagnetic fields on sea urchin gametes and embryos. p.131

Silván Pobes, E.M., D. Gil Cid, P. Domínguez Alonso, M. Escribano Ródenas. More about Spanish Ordovician crinoids. poster p.110

Smirnov, A. Some notes on the systematics of the apodid holothurians. p.132

Smirnov, I. The relationship between type of development and type of distribution of polar brittle-stars. p.132

Smirnov, I. Creation of computer picture identification key for the Arctic ophiuroids. p.132

Smirnov, I. Polar ophiuroids and their symbiotic relations. p.133

Smith, A., J. Matthiopoulos, I.G. Priede. The simulated deep-sea holothurian. p.111

Smith, A.B., C. Jeffery. Estimating extinction levels and changes in diversity and disparity across the Cretaceous/Tertiary boundary for echinoids. p.111

Solis-Marin, F.A., M.D. Herrero-Perezrul, A. Laguarda-Figueras. New records of the lagoon reef holothurians of Puerto Morelos, Quintana Roo, Mexico. p.111

Solis-Marin, F.A., C. Esquivel-Macias, B.E. Buitron-Sanchez, A. Flores de Dios-Gonzalez. Unusual Pennsylvanian crinoids from Sal Salvador Patlanoaya, Puebla, Mexico. p.112

Solovjev, A.N., A.V. Markov. Echinoids at the Cretaceous/Paleogene boundary. p.133

Sonnenholzner, J., J.M. Lawrence. Incidence of disease and sublethal predation in *Enope micropora* L. Agassiz, 1841 (Echinoidea: Clypeasteroida) at Playas, Ecuador. poster p.112

Spirlet, C., P. Grosjean, M. Jangoux. Closed-circuit cultivation of the edible sea-urchin *Paracentrotus lividus*: optimization and control of gonadal growth. p.112

Sprinkle, J., C.D. Sumrall. Phylogenetic analysis of Echinodermata based on primitive fossil taxa. p.113

Stancyk, S.E., T. Fujita, C. Muir. Predation behavior on swimming organisms by *Ophiura sarsi*. p.113

Stewart, B.G., P.V. Mladenov. Population structure, growth and recruitment of the euryalnid snake star *Astrobrachion constrictum* (Echinodermata: Ophiuroidea) in Doubtful Sound, Fiordland, NZ. p.114

Stewart, B.G. Observations on induced spawning and ovulation in the snake star *Astrobrachion constrictum* (Echinodermata: Ophiuroidea). poster p.114

Stubbs, A.M., K.R. Mattheai. The behavioral cycle of *Pisaster giganteus*; is it related to light? poster p.114

Szulgit, G.K., R.E. Shadwick. Determining the nature of stiffness alteration in holothurian dermis using dynamic mechanical analysis. p.115

Tamplin, J.W., W.B. Stickle. Effects of temperature on feeding, activity, and oxygen consumption rate of *Leptasterias epiclora*. poster p.115

Telford, M., O. Ellers. The moving teeth of echinoids. p.115

Temara, A., W.J. Langston, M. Warnau, M. Jangoux, P. Dubois. Value of *Asterias rubens* (Asteroidea) in bioindicating heavy metal contamination in naturally-occurring conditions. p.116

Thandar, A.S. Composition, distribution and probable origin of the southern African holothuroid echinoderms. p.116

Thandar, A.S. A new dendrochirote holothuroid from deep waters of the west coast of South Africa.

poster p.117

Thierry, J., D. Néraudeau, G. Breton, P. Moreau. Variations in echinoderm biodiversity during the Cenomanian-Early Turonian (Upper Cretaceous) transgressive episode in Charentes (France). p.117

Thurmond, F.A., J.A. Trotter, T.J. Koob, J.M. Bowness. Microfibrils from sea cucumber dermis belong to the fibrillin family, and their long-range elasticity is a crucial component of mutable collagenous tissues. p.118

Tominaga, H. Development of the Japanese keyhole sea urchins, *Astriclypeus manni* and *Echinodiscus tenuissimus*. poster p.118

Tosuji, H. Determination of oral-aboral axis in larvae of the starfish, *Asterina pectinifera*. poster p.119

Trotter, J.A., G. Lyons-Levy, D. Luna, K. Chino, M.M. Koob-Edmunds, T.J. Koob. Non-collagenous proteins modulate the stiffness of sea cucumber dermis *in vivo* and interactions between isolated collagen fibrils *in vitro*. p.119

Turner, R.L. The metameric echinoderm. p.120

Unuma, T., T. Suzuki, T. Kurokawa, T. Yamamoto, T. Akiyama. A protein identical to the yolk protein precursor is stored in the testis of male sea urchins. poster p.120

Uthicke, S. Seasonality in asexual reproduction of three tropical aspidochirotid holothurians and the respiration of their fission products. p.120

VandenSpiegel, D., I. Eeckhaut, M. Jangoux. On the association between the shrimp *Synalpheus stimpsoni* (De Man, 1888) and the crinoid *Comaster multifidus* (Hartlaub, 1890). poster p.121

VandenSpiegel, D., H.H. Janssen, M. Jangoux. Ultrastructure of ciliated urns in *Archaster typicus* Müller and Troschel, 1840 (Asteroidea, Echinodermata). poster p.121

Vélez-Andrade, L.V., O. Sosa-Nishizaki. Some biological aspects of the purple sea urchin *Strongylocentrotus purpuratus* from Todos Santos Island, B.C., Mexico. poster p.121

Ventura, C.R.R., J.S. Santos, A.P.C. Falcao, C.S. Fiori. Reproduction and food intake analysis of *Astropecten cingulatus* (Asteroidea: Paxillosida) in the upwelling environment of Cabo Frio (Brazil). poster p.122

Victorovskaya, G.I. Distinguishing peculiarities of sea urchin *Strongylocentrotus intermedius* reproduction in northern Primorye. p.133

Warnau, M., M. Iaccarino, A. De Biase, A. Temara, M. Jangoux, P. Dubois, G. Pagano. Effects of heavy metals on the fertilization and early development of the echinoid *Paracentrotus lividus*. p.122

Warnau, M., M. Iaccarino, A. Temara, G. Pagano. Developmental toxicity of different chemical forms of lead in the echinoid *Paracentrotus lividus*. poster p.123

Wasson, K.M., S.A. Watts. New method for evaluating the role of steroids in echinoids. poster p.123

Wheatley, K., R.G. Brown, R.E. Scheibling, J.F. Jellett. Coelomocyte oxidative activity of the green sea urchin (*Strongylocentrotus droebachiensis*) following challenge by bacterial and amoebic pathogens. poster p.124

Williams, C.T., L.G. Harris. A comparison of the growth of juvenile *Strongylocentrotus droebachiensis* on natural and artificial diets. poster p.124

Wray, G.A. Origin and diversification of echinoderm body architecture: insights from the expression of body-patterning genes. p.125

Wu, J.-Y., C.-P. Chen, C.-F. Hui, S.-P. L. Hwang, D.J. Miller. Preliminary studies on Hox type homeoboxes in the echinoids *Stomopneustes variolaris* and *Tripneustes gratilla*. poster p.125

Xing, J., F.-S. Chia. Phagocytosis of sea cucumber amoebocytes: a flow cytometric study. p.126

Yakovlev, Y.M. The temperature tolerance of adult sea-stars (*Asterias amurensis*) in the laboratory. p.134

Young, C.M., R.H. Emson, P.A. Tyler, M.G. Devin. Social behavior, reproduction and larval development in the deep-sea spatangoid urchin *Archaeopneustes hystrix*. p.126

ECHINODERM SPECIALIST'S 'KEYWORD' LIST

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OPHIUROIDEA  
 TAXONOMY ECOLOGY  
 TAXONOMY  
 ECHINOIDEA TERTIARY MESOZOIC  
 BIODIVERSITY FUNCTIONAL-MORPHOLOGY  
 ASTEROIDEA CULCITA FORAGING SYSTEMATICS  
 CRINOIDEA  
 ECHINOIDEA  
 CULTURE FISHERIES  
 CULTURE MEDICINAL-VALUE BIOLOGY  
 OPHIUROIDEA  
 CRINOIDEA PALEOZOIC FOSSIL  
 HOLOTHUROIDEA MORPHOLOGY DEVELOPMENT PHYLOGENY PHYSIOLOGY  
 OPHIUROIDEA  
 LARVAE JUVENILES REPRODUCTION ECOLOGY EVOLUTION  
 ECHINOIDEA DISEASE BACTERIA-(PATHOGENS) TEMPERATURE  
 CRINOIDEA ISOCRINIDS FOSSIL RECENT  
 ECHINOIDEA POPULATION  
 BLASTOID  
 FAUNISTICS TROPICAL-SUBTROPICAL-SOUTH-ATLANTIC OCEANIC-ISLANDS  
 OPHIUROIDEA  
 EDRIOSTEROIDS TAXONOMY PHYLOGENY FUNCTIONAL-MORPHOLOGY  
 TAXONOMY REPRODUCTIVE-TECHNIQUE  
 ECHINOIDEA GENETICS BIOLOGY PALEONTOLOGY  
 ECHINOIDEA LARVAE EVOLUTION ECOLOGY DEVELOPMENT  
 CRINOIDEA  
 CORAL-REEF-MANAGEMENT ECOLOGY  
 CHEMORECEPTION SENSORY-SYSTEMS MIGRATIONS  
 ASTEROIDEA PHYLOGENY PALEOECOLOGY  
 FOSSIL CRINOIDEA  
 POPULATION-DYNAMICS REPRODUCTION ENVIRONMENTAL-RELATIONSHIPS  
 ECHINOIDEA  
 POPULATIONAL-STRUCTURE GROWTH AQUACULTURE  
 ASTEROIDEA MESOZOIC CENOZOIC EVOLUTION  
 ECHINOIDEA  
 PALEOBIOLOGY PALEOZOIC CRINOIDEA  
 FOSSIL CENOZOIC ASTEROIDEA ECHINOIDEA  
 TAXONOMY ECHINODERMS ANDAMAN-SEA  
 DEVELOPMENT REPRODUCTION EVOLUTION FUNCTIONAL-MORPHOLOGY  
 ECOLOGY AQUACULTURE MEDITERRANEAN  
 ECHINOIDEA GENETICS DEVELOPMENT  
 ECOLOGY POPULATION FISHERY ECHINOIDEA HOLOTHUROIDEA  
 ULTRASTRUCTURE PHYSIOLOGY TAXONOMY ZOOGEOGRAPHY  
 ASTEROIDEA PREDATION SYSTEMATICS BEHAVIOR ECOLOGY  
 ECHINOIDEA OPHIUROIDEA CRINOIDEA  
 ECHINODERM-HOSTS-PARASITES  
 TAXONOMY  
 ASEXUAL-REPRODUCTION POPULATION-ECOLOGY LIFE-HISTORY SYSTEMATICS  
 BIOGEOGRAPHY TAXONOMY ECOLOGY EVOLUTION  
 REARING POPULATION ECOLOGY  
 ECOLOGY EXPLOITATION BIOEROSION BIOTURBATION  
 MANAGEMENT COMMERCIAL RESOURCE TAGGING MOVEMENT  
 ASTEROIDEA EMBRYOLOGY ECOLOGY BEHAVIOR  
 HOLOTHUROIDEA TAXONOMY MORPHOLOGY  
 ECHINOIDEA  
 STALKED-CRINOIDS ONTOGENY BATHYMETRY  
 ECOLOGY ECHINOIDEA OPHIUROIDEA ASTEROIDEA  
 ECHINOIDEA MORPHOFUNCTIONAL-ADAPTATIONS SYMBIOSSES EVOLUTION  
 ECHINOIDEA FLINT-PLEISTOCENE-DEPOSITS  
 ECHINOIDEA FOSSIL  
 CRINOIDEA OPHIUROIDEA ASTEROIDEA FUNCTIONAL-MORPHOLOGY ECOLOGY TAXONOMY  
 ECHINOIDEA  
 HOLOTHUROIDEA  
 INVERTEBRATES GROWTH  
 OPHIUROIDEA ECOLOGY  
 REGENERATION-MECHANISMS MORPHOLOGY DEVELOPMENT  
 CARIBBEAN-FOSSIL-ECHINOIDEA SYSTEMATICS BIOSTRATIGRAPHY EVOLUTION  
 ECHINOIDEA  
 ECHINOIDEA BIOMECHANICS EVOLUTION ECOLOGY  
 LARVAE SEA-URCHINS PLANKTONIC-FORMS DEVELOPMENT  
 CRINOIDEA  
 TAXONOMY FUNCTIONAL-MORPHOLOGY PALEOECOLOGY CRINOIDEA  
 COMMUNITY GAMETES EMBRYOS  
 FEEDING-BIOLOGY TROPHIC-INTERACTIONS ECOLOGICAL-INTERACTIONS  
 LARVAE ASTEROIDEA ECHINOCULTURE  
 GROWTH TAXONOMY BIOGEOGRAPHY ANTARCTICA  
 SPECIATION EVOLUTION DEVELOPMENT BIODIVERSITY-GENETICS MOLECULAR-PHYLOGENY  
 PHYSIOLOGY FUNCTIONAL-ANATOMY  
 NUTRITION GROWTH AQUACULTURE  
 FUNCTIONAL-MORPHOLOGY BIOCHEMISTRY ADHESION  
 SYMBIOSSES NITROGEN-METABOLISM OSMOREGULATION  
 TAXONOMY BIODIVERSITY ECOLOGY EVOLUTION  
 OPHIUROIDEA OSSICLES BEHAVIOR  
 ASTEROIDEA PREDATION SUBLITTORAL POPULATION  
 OPHIUROIDEA ASTEROIDEA ECOLOGY TAXONOMY  
 ECOLOGY POPULATION-DYNAMICS BIODIVERSITY  
 ECOLOGY BEHAVIOR DISTRIBUTION TAXONOMY  
 ECHINOIDEA CRETACEOUS SYSTEMATICS BIOSTRATIGRAPHY PALAEOECOLOGY  
 OPHIUROIDEA POPULATION  
 PALEOECOLOGY BIOTIC-INTERACTIONS  
 MOLECULAR DEVELOPMENTAL BIOLOGY  
 CRINOIDEA FOSSIL  
 ASTEROIDEA PATHOLOGY

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 MEYER, CHRISTIAN  
 MIROŇOV, ALEXANDER  
 MITROVIĆ-PETROVIĆ, JOVANKA  
 MIladenov, PHILIP  
 MOOI, RICHARD  
 MERRILL, JOHN  
 MOTOKAWA, TATSUO  
 MOUCHATY, SUZETTE  
 MUNK, ERIC  
 NAIDÉNKO, TAMARA  
 NAKAMURA, RAYMOND  
 NAKANO, EIZO  
 NEBELSICK, JAMES  
 NEILL, BRUCE  
 NESTLÉR, HELMUT  
 NEUMANN, CHRISTIAN  
 NICHOLS, DAVID  
 NICOSIA, UMBERTO  
 NISHIHIRÀ, MORITAKA  
 O'CONNOR, BRENDAN  
 O'HARA, TIMOTHY  
 O'LOUGHLIN, P. MARK  
 OJEDA, F. PATRICIO  
 OJI, TATSUO  
 OŁSZĘWSKA-NEJBERT, DANUTA  
 OLVER, JANE

ECHINOIDEA DIADEMATID-ASSOCIATIONS  
 ECHINOIDEA MORPHOLOGY EVOLUTION PHYSIOLOGY  
 ASTEROIDEA ECHINOIDEA TAPHONOMY FOSSIL RECENT CROWN-OF-THORNS STARFISH  
 CULTIVATION ECOLOGY GROWTH DIGESTION RESOURCES-ALLOCATION  
 ASTEROIDEA BIOGEOGRAPHY SYSTEMATICS  
 PARASITOLOGY ASSOCIATED-CRUSTACEANS MYZOSTOMIDA-GALLS AND CYSTS  
 ASTEROIDEA  
 ECOLOGY ECOTOXICOLOGY PLASTICITY BIODIVERSITY  
 FOSSIL ECHINOIDEA CRETACEOUS CENOZOIC MEDITERRANEAN-REGION  
 BIODIVERSITY ECOLOGY  
 HOLOTHUROIDEA  
 ECHINOIDEA ECOLOGY DISEASE CULTIVATION  
 ASTEROIDEA HOLOTHUROIDEA OPHIUROIDEA ECHINOIDEA BEHAVIOR REPRODUCTION MORPHOLOGY  
 ECOLOGY  
 TAXONOMY PALEOECOLOGY EVOLUTION  
 ECHINOIDEA  
 CRINOIDEA ULTRASTRUCTURE NEUROANATOMY  
 OPHIUROIDEA TAXONOMY BEHAVIOR FUNCTIONAL-MORPHOLOGY  
 ABYSSAL ASTEROIDEA BRISINGIDAE ECHINOIDEA  
 TAXONOMY PALEOECOLOGY TAPHONOMY CRINOIDEA  
 PHYSIOLOGY MUSCLE CONNECTIVE-TISSUE  
 CRINOIDEA FOSSIL PALEOECOLOGY SYSTEMATICS  
 ECHINOIDEA ECOLOGY BIOGEOGRAPHY TAXONOMY  
 FOSSIL BLASTOIDEA  
 ECHINOIDEA ASTEROIDEA FERTILIZATION ACROSOME-REACTION GLYCOCONJUGATES SIGNAL-TRANSDUCTION  
 OPHIUROIDEA ECHINOIDEA ASTEROIDEA FOSSIL RECENT TERATOLOGY  
 OPHIUROIDEA SYSTEMATICS CLADISTICS  
 OPHIUROIDEA TAXONOMY MORPHOLOGY ECOLOGY  
 PALEOECOLOGY OPHIUROIDEA  
 HOLOTHUROIDEA  
 ECHINOIDEA CRINOIDEA FOSSIL  
 ASTEROIDEA TAXONOMY DISTRIBUTION REPRODUCTION  
 LARVAL-BIOLOGY ECOLOGY MORPHOLOGY PHYSIOLOGY  
 TAXONOMY PALAEOBIOLOGY BIOZONATION FUNCTIONAL-MORPHOLOGY  
 HATCHERY CULTURE TAXONOMY ZOOGEOGRAPHY HOLOTHUROIDEA  
 BIODIVERSITY HABITAT-MODIFICATION SURVEY  
 ASTEROIDEA EVOLUTION DEVELOPMENT  
 FOSSIL CRINOIDEA AUSTRALIAN  
 PHOTORECEPTION POLARIZED-LIGHT DIFFUSE-SENSORY-SYSTEMS OPHIUROIDEA  
 REPRODUCTION RECRUITMENT SETTLEMENT POPULATION-DYNAMICS  
 FOSSIL CRINOIDEA SYSTEMATICS PALEOECOLOGY  
 ECHINOCULTURE PSAMMECHINUS-MILIARIS NUTRITION GROWTH  
 ECHINOIDEA  
 ECHINOIDEA HOLOTHUROIDEA FEEDING ECOLOGY  
 ECHINOIDEA MARINE-POLLUTION BIOASSAY SPAWNING PERIODICITY  
 CRINOIDEA TAXONOMY DISTRIBUTION ECOLOGY  
 ASTEROIDEA SPATIAL-DISTRIBUTION  
 SYSTEMATICS HOLOTHUROIDEA TAXONOMY NATURAL-HISTORY  
 NUTRITION REPRODUCTION PHYSIOLOGY STRATEGIES  
 CRINOIDEA COLUMNS TAXONOMY BIOSTRATIGRAPHY  
 OPHIUROIDEA MORPHOLOGY BIOMECHANICS  
 ECHINOIDEA PHYLOGENY POPULATION-GENETICS  
 ASTEROIDEA REPRODUCTION  
 OPHIUROIDEA HOLOTHUROIDEA TAXONOMY CULTIVATION  
 OPHIUROIDEA TAXONOMY MORPHOLOGY BEHAVIOUR ECOLOGY  
 HOLOTHUROIDEA  
 BLASTOIDS CRINOIDEA MODERN PHANEROZOIC  
 ECHINOIDEA MIOCENE PARATETHYS-BASIN MEDITERRANEAN  
 ASTEROIDEA SYSTEMATICS BRISINGIDA DEEP-SEA  
 POPULATION-DYNAMICS BEHAVIOR REPRODUCTION REGENERATION  
 BIOLUMINESCENCE PHYSIOLOGY NEUROBIOLOGY FUNCTIONAL-ECOLOGY  
 TAXONOMY EVOLUTION FUNCTIONALITY MESOZOIC-CRINOIDEA SACCOCOMA  
 PALAEOECOLOGY TAXONOMY TAPHONOMY BIODIVERSITY-(+ EXTINCTIONS)  
 ASTEROIDEA ECOLOGY TAXONOMY POPULATION-DYNAMICS  
 HOLOTHUROIDEA TAXONOMY ZOOGEOGRAPHY  
 TASMANIA ECHINODERM ECOLOGY REPRODUCTION  
 ECHINOIDEA LARVAE REPRODUCTION EMBRYOLOGY DEVELOPMENT  
 ECHINOIDEA FISHERIES AQUACULTURE  
 CHEMICAL-ECOLOGY REPRODUCTION NUTRITION ECOLOGY  
 OPHIUROIDEA TAXONOMY BIODIVERSITY  
 ECOLOGY GENETIC-IDENTIFICATION DISPERSAL  
 ASTEROIDEA HOLOTHUROIDEA OPHIUROIDEA ECHINOIDEA BEHAVIOR REPRODUCTION MORPHOLOGY  
 CRINOIDEA PHYLOGENY ECOLOGY BIOGEOGRAPHY MORPHOLOGY  
 MEZOZOIC TAPHONOMY  
 ECHINOIDEA  
 ECHINOIDEA BIOSTRATIGRAPHY TAXONOMY PALEOECOLOGY EVOLUTION  
 REPRODUCTION DEVELOPMENT ASEXUAL GENETICS  
 ECHINOIDEA  
 EMBRYOLOGY ECHINOIDEA  
 CATCH-CONNECTIVE-TISSUE STALKED-CRINOIDS  
 ECHINOIDEA CLYPEASTEROIDA SYSTEMATICS  
 GROWTH REPRODUCTION  
 ECHINOIDEA METAMORPHOSIS POLLUTION BIOASSAY CRYOPRESERVATION  
 ECHINOIDEA ECOLOGY EVOLUTION BIOMECHANICS EDUCATION  
 ECHINOIDEA EMBRYOGENESIS EXTRACELLULAR-MATRIX CELL-ADHESION  
 ECHINOIDEA ECOLOGY PALAEONTOLOGY TAPHONOMY BIODIVERSITY  
 BIOGEOGRAPHY ECHINOMETRIDS GENETICS SYSTEMATICS  
 ECHINOIDEA  
 CRETACEOUS ECHINOIDEA SPATANGOIDA PALEOECOLOGY STRATIGRAPHY  
 FUNCTIONAL-MORPHOLOGY EVOLUTION REPRODUCTION  
 TAXONOMY SYSTEMATICS JURASSIC TETHYS  
 ECOLOGY BIODIVERSITY POPULATION BEHAVIOR  
 OPHIUROIDEA TAXONOMY BIOTURBATION DENSITY-REGULATORY-FACTORS  
 TAXONOMY NATURAL-HISTORY BIOGEOGRAPHY CONSERVATION  
 HOLOTHUROIDEA  
 ECOLOGY BIOLOGY ECO-PHYSIOLOGY  
 CRINOIDEA TAXONOMY EVOLUTION BIOGEOGRAPHY REGENERATION  
 IRREGULAR-ECHINOIDS CRETACEOUS PALEOBIOGEOGRAPHY EVOLUTIONARY-TRENDS  
 ECOLOGY ECHINOIDEA

PABIAN, ROGER  
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PORTELL, ROGER  
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ROBINSON, SHAWN  
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SCHUETZ, ALLEN  
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SHEPHERD, SCORESBY  
SHIRLEY, THOMAS  
SHLEPR, MICHAEL  
SINGLETARY, ROBERT  
SKOLD, MATTIAS  
SLOAN, NORMAN  
SMILEY, SCOTT  
SMIRNOV, ALEXEI  
SMIRNOV, IGOR  
SMITH, ALBERT  
SMITH, ANDREW  
SOLOVJEV, ANDREY  
SONNENHOLZNER, JORGE  
STAMPANATO, SALVATORE  
STANCYK, STEPHEN  
STEWART, BRIAN  
STORC, RICHARD  
STRATHMANN, RICHARD  
STUMP, RICHARD  
SUTER, SHERMAN  
TABLADO, ALEJANDRO  
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TAKAHASHI, KEIICHI  
TALBOT, TIFFANY  
TAVARES, YARA A.  
THANDAR, AHMED  
THIERRY, JACQUES  
THORSEN, MARIANNE  
TOMINAGA, HIDEYUKI  
TUTERA, PETER  
UBAGHS, GEORGES  
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VADAS, ROBERT  
VADET, ALAIN  
VALENTINE, JOHN  
VAN DER HAM, RAYMOND W.J.M.  
VANDENPIEGEL, DIDIER  
VIKTOROVSKAYA, GALINA  
VISTISEN, BODIL  
von BRAND, ELISABETH  
WASSON, KRISTINA  
WATTS, STEPHEN  
WEBSTER, GARY  
WELSCH, ULRICH  
WHITE, CHRIS  
WILKIE, IAIN  
WILLCOX, MARK  
WORHEDE, GERT  
WRAY, GREGORY  
YAMAGUCHI, MASASHI  
YANAGISAWA, TOMIO  
YOSHIZATO, KATSUTOSHI  
ZAVODNIK, DUSAN  
ZEIDLER, WOLFGANG  
ZITT, JIRI

CRINOIDEA PALEOECOLOGY BIOSTRATIGRAPHY TAXONOMY  
BRACKISH-WATER ECOLOGY ADAPTATION  
FOSSIL ECHINOIDEA  
ECHINOIDEA ASTEROIDEA  
FOSSIL CRINOIDEA  
SYSTEMATIC PALEOECOLOGY PALAEOGEOGRAPHY  
OPHIUROIDEA ECOLOGY POPULATION-DYNAMICS PHYSIOLOGY  
TAXONOMY  
ECHINOIDEA  
CENozoic ECHINODERMS-S.E. USA-CARIBBEAN  
PATIRIELLA-vivipara  
CRINOIDEA EARLY-PALAEozoic BIOSTRATIGRAPHY TAXONOMY  
BIOLOGY ECOLOGY POLLUTION ENVIRONMENT  
SYSTEMATICS PALEOECOLOGY BIOSTRATIGRAPHY FOSSIL HOLOTHUROIDEA  
CULTURE FISHERY ECOLOGY POPULATION-DYNAMICS  
ASTEROIDEA OPHIUROIDEA PHYSIOLOGICALLY-ACTIVE-STEROIDS  
ECHINOIDEA ECOLOGY SPATIAL-DISTRIBUTION USE-OF-DRIFT-ALGAE  
ECHINOIDEA GROWTH  
FOSSIL ECHINOIDEA  
ASTEROIDEA OPHIUROIDEA TAXONOMY ANATOMY  
BATHY-ECOLOGY ONTOGENY STALKED-CRINOIDEA JURASSIC-TO-RECENT  
ASTEROIDEA TAXONOMY  
TAXONOMY BIODIVERSITY ECOLOGY  
LARVAE DISPERSAL BIOGEOGRAPHY RECRUITMENT SETTLEMENT  
ASTEROIDEA ECHINOIDEA OPHIUROIDEA TAXONOMY REPRODUCTION BIODIVERSITY  
JUVENILES  
TAXONOMY REPRODUCTIVE-BIOLOGY POPULATION-STRUCTURE ASSOCIATES  
ECHINOIDEA TAXONOMY ECOLOGY  
ECHINOIDEA ECOLOGY  
CRAB-ASTEROID-INTERACTIONS  
OPHIUROIDEA  
ECOLOGY TAXONOMY  
OPHIUROIDEA REGENERATION DEVELOPMENT  
HOLOTHUROIDEA FISHERIES  
HOLOTHUROIDEA PHYSIOLOGY DEVELOPMENT EVOLUTION  
TAXONOMY ZOOGEOGRAPHY EVOLUTION PHYLOGENY PALEONTOLOGY HOLOTHUROIDEA  
POLAR-OCEANS OPHIUROIDEA DATABASES  
PATHOLOGY/PATHOBIOLOGY HEMATOLOGY IMMUNE-SYSTEM LINKS-TO-PROTOCHORDATES/VERTEBRATES  
PALAEOBIOLOGY SYSTEMATICS  
ECHINOIDEA EVOLUTION PALEOECOLOGY  
ECOLOGY BIOLOGY TAXONOMY BIOSAYS  
ASTEROIDEA  
OPHIUROIDEA REGENERATION PREDATION POPULATION GROWTH  
EURYALIDS OPHIUROIDEA REGENERATION  
OPHIUROIDEA TAXONOMY PALEOECOLOGY CRETACEOUS  
LARVAE EVOLUTION BODY-PLANS  
ASTEROIDEA POPULATION-DYNAMICS ECOLOGICAL-MODELLING ENVIRONMENTAL-MONITORING  
ECHINOIDEA FOSSIL  
ASTEROIDEA TAXONOMY SOUTH-ATLANTIC  
FAUNA BIODIVERSITY BIOLOGY LARVAL-DISTRIBUTION POPULATION-DYNAMICS  
MUSCLE-PHYSIOLOGY SPERM-MOTILITY CONNECTIVE-TISSUE  
OPHIUROIDEA REPRODUCTION DEVELOPMENT BEHAVIOR FUNCTIONAL-MORPHOLOGY  
ECHINOIDEA ECOLOGY REPRODUCTION POPULATION-DYNAMICS MORPHOMETRY  
HOLOTHUROIDEA TAXONOMY  
ECHINOIDEA JURASSIC  
ECHINOIDEA GUT-MICROBIOTA  
ECHINOIDEA IRREGULAR-SEA-URCHIN AGE-DETERMINATION POPULATION-ECOLOGY DEVELOPMENT  
TAXONOMY BIODIVERSITY CONSERVATION  
FOSSIL  
OPHIUROIDEA ECOLOGY FEEDING-ECOLOGY GROWTH-BANDS ARCTIC-ECHINODERMS DEEP-SEA ECHINODERMS  
GRAZING BEHAVIOR REPRODUCTIVE-ECOLOGY  
ECHINOIDEA TAXONOMY EVOLUTION  
OPHIUROIDEA ECHINOIDEA ECOLOGY  
ECHINOIDEA CAMPANIAN-MAASTRICHTIAN-DANIAN NW-EUROPE TAXONOMY  
DEFENSIVE-MECHANISMS MORPHOLOGY SYMBIOSIS  
REPRODUCTION INVERTEBRATES BIOTIC-ABIOTIC-CONDITIONS  
OPHIUROIDEA  
HOLOTHUROIDEA CYTOGENETICS POPULATION-GENETICS  
ECHINOIDEA REPRODUCTION  
GROWTH REPRODUCTION NUTRITION PHYSIOLOGY HORMONES  
CRINOIDEA LATE-PALAEozoic TAXONOMY PALEOGEOGRAPHY BIOSTRATIGRAPHY  
CRINOIDEA MORPHOLOGY NERVOUS-SYSTEM CONNECTIVE-TISSUE  
CRINOIDEA LARVAL-BIOLOGY TAXONOMY SENSORY-BIOLOGY  
OPHIUROIDEA ECHINOIDEA FUNCTIONAL-MORPHOLOGY  
POPULATION-GENETICS MOLECULAR-PHYLOGENY EXPRESSED-GENES  
ECHINOIDEA TAPHONOMY ECOLOGY ACTUOPALEONTOLOGY  
EVOLUTION DEVELOPMENT MORPHOGENESIS  
ACANTHASTER-PLACCI RESOURCE-MANAGEMENT  
METAMORPHOSIS ECHINOIDEA DEVELOPMENT  
COLLAGEN EXTRACELLULAR-MATRIX ELM  
TAXONOMY ECOLOGY DISTRIBUTION ADRIATIC-SEA  
TAXONOMY ASTEROIDEA  
TAXONOMY PALEOBIOLOGY TAPHONOMY PALEOECOLOGY

## PUBLICATIONS OF H. BARRACLOUGH (BARRY) FELL

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In 1974, Fell founded the Polynesian Epigraphic Society, and immediately began publishing the journal *Polynesian Epigraphic Society Occasional Publications*. This society soon broadened in scope and became the Epigraphic Society, and the journal became the *Epigraphic Society Occasional Publications* (also known as *ESOP*). Barry contributed very numerous articles to *ESOP*. The Epigraphic Society and *ESOP* flourish today; the current national Secretary of the Epigraphic Society is Mr. Donal Buchanan, 8216 Labbe Lane, Vienna, Virginia 22180, USA. Some articles by Fell in early issues:

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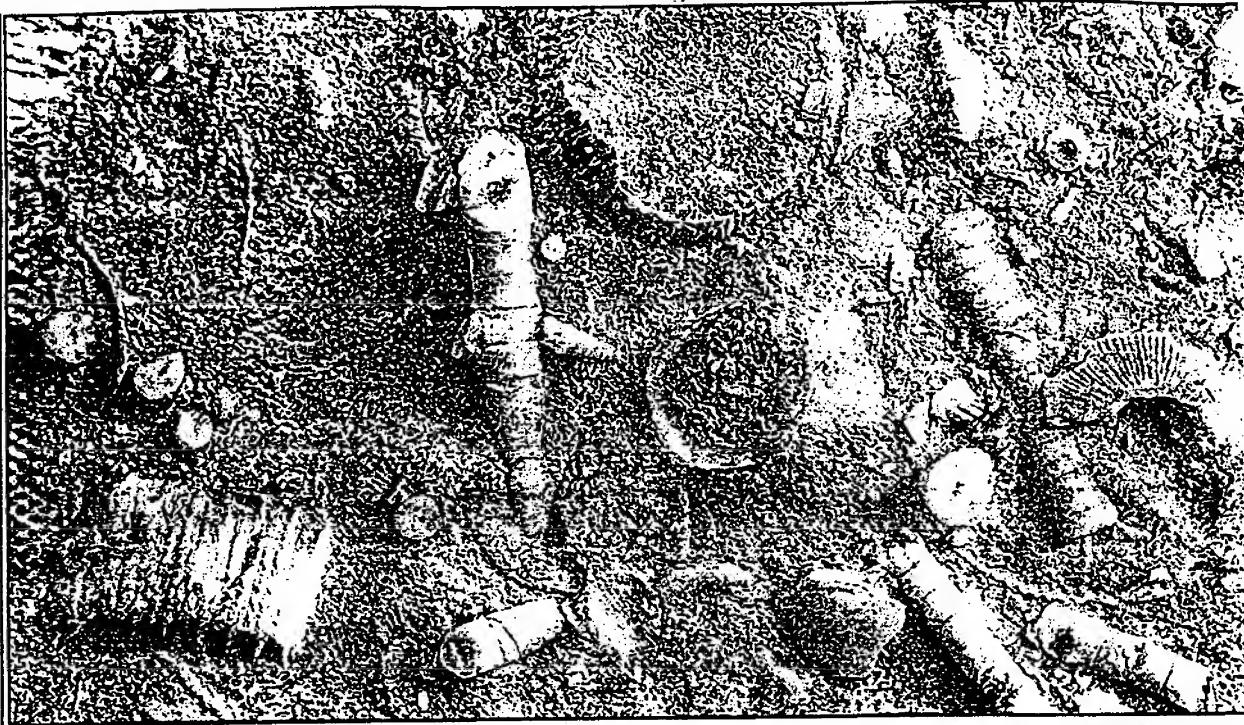
To the editor,

A call to arms! I have finally amassed enough evidence to indicate conclusively that a vile and subtle plot is underway. The enclosed pair of publications, extracted from sources completely separated by vast gulfs of time, space and culture indicate that an infernal brain is at work, a brain that has designed a most desperate yet insidiously clever gambit, a brain that will stop at naught to accomplish the complete and utter demolition of nothing less than our comfortable and well-documented paradigm of the classification and phylogeny of life on earth. Examine these publications carefully and what can you not fail to notice? In both of them appears the ostensibly gentle, yet deadly poisonous suggestion that (dare I breathe it myself, even on mute paper?), that crinoids are not echinoderms at all, but actually belong to that *other* kingdom, the plants! Note how the author of this cunning ploy has dropped the hints so widely, yet without so much as a breath of authorship associated with either: in one case, the widely respected Associated Press; in the other, a commercial collection of British videotapes. It can only mean that this nameless villain has insinuated itself (I cannot even suggest a gender) into every fiber of society. Note also the subtleness. In the first, there is a hint of uncertainty, that crinoids may be animals OR plants. In the second, the word is misspelled to throw us off the track. But we cannot be deceived. We must gird for battle, uproot this deadly scourge and expose the evil genius behind it. Remember, if crinoids are permitted to be wrenched from their pentamerous fold, what group will be next?

Yours in fear for his livelihood because he is not a botanist,

*Charles*

Charles G. Messing



ASSOCIATED PRESS

Brachiopod (ancient clam) and horn-coral fossils embedded in limestone left behind after this summer's floodwaters cut a 15-foot-deep gorge below the Coralville Lake Reservoir near Iowa City, Iowa.

## Receding floodwaters reveal Iowa fossil bed

IOWA CITY, Iowa — This summer's raging floodwaters rolled back the clock 375 million years at Coralville Lake.

Water at the lake's dam has receded, but not before it washed away a couple of roads and cut an impressive gorge south of the dam's spillway that exposed hundreds of fossils from the Devonian Era.

"It's also known as the age of the fishes," says park ranger Randy Haas.

With good reason. Protruding from the soft limestone bed can be seen part of an ostracoderm, an armor-plated fish that grew up to 20 feet in length. Also on view are scores of brachiopods (ancient clams), horn corals, and crinoids, also known as sea lilies.

"Crinoids are an animal or plant or something in between. It depends on what archaeologist you talk to," Haas said.

Coralville Lake, four miles north of Iowa City, was created in 1958 with a dam project as a way to moderate stream flows on the Iowa River.

The dam regulates runoff from 3,084 square miles of land upstream to give flood protection to 1,703 square miles of Iowa River valley below.

But for 28 straight days over the summer, floodwaters cascaded

over the top and cut the channel roughly 15 feet deep into underlying rock.

Flood-related repairs will have to be made, but Haas says they'll be done delicately. He envisions the area becoming a training ground for geologists and archaeologists, and a prime field-trip site for schoolchildren.

## DR. WHO



## THE SEEDS OF DOOM

A research team unwittingly digs up two mysterious pods. The identity of the pods is no mystery to the Doctor. They are Krynnoid - a hostile alien species of plant life. Can the Doctor arrest its development before it threatens to turn

Earth's vegetation hostile too? (Color)

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